TS500-E5

Pedestal/5U Rackmount Server

User Guide



E3903

First Edition V1
June 2008

Contents

Contents

Contents

Contents

Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

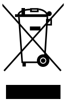
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING! The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This Class A digital apparatus complies with Canadian ICES-003.



This symbol of the crossed out wheeled bin indicates that the product (electrical, electronic equipment and mercury-containing button cell battery) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

Safety information

Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, contact a qualified service technician or your dealer. Ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you service.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Servicing of this product or units is to be performed by trained service personnel only.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.

This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

Lithium-Ion Battery Warning

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

CAUTION! This server system is heavy. Ask for assistance when moving or carrying the system.

About this guide

Audience

This user guide is intended for system integrators, and experienced users with at least basic knowledge of configuring a server.

Contents

This guide contains the following parts:

1. **Chapter 1: Product Introduction**

   This chapter describes the general features of the server, including sections on front panel and rear panel specifications.

2. **Chapter 2: Hardware setup**

   This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

3. **Chapter 3: Installation options**

   This chapter describes how to install optional components into the barebone server.

4. **Chapter 4: Motherboard information**

   This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.

5. **Chapter 5: BIOS information**

   This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.

6. **Chapter 6: RAID configuration**

   This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

7 **Chapter 7: Driver installation**

   This chapter provides instructions for installing the necessary drivers for different system components.

Conventions

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.



DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.



CAUTION: Information to prevent damage to the components when trying to complete a task.



IMPORTANT: Instructions that you MUST follow to complete a task.



NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1+Key2+Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: <Ctrl+Alt+D>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets. Example: At the DOS prompt, type the command line: **`format A:/S`**

References

Refer to the following sources for additional information, and for product and software updates.

1. **ASUS Server Web-based Management (ASWM) user guide**

   This manual tells how to set up and use the proprietary ASUS server management utility.

2. **ASUS websites**

   The ASUS websites worldwide provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information.

Chapter 1

Product introduction

This chapter describes the general features of the chassis kit. It includes sections on front panel and rear panel specifications.



1.1 System package contents

Check your system package for the following items.

Model Name	TS500-E5/PA4	TS500-E5/RX8
Chassis	ASUS T55 Pedestal 5U Rackmount Chassis	ASUS T55 Pedestal 5U Rackmount Chassis
Motherboard	ASUS DSAN-DX/TS500-E5 Server Board	ASUS DSAN-DX/TS500-E5 Server Board
Component	1 x 670W Single Power Supply 1 x SATA/SAS Backplane (BP4LX-T55) with 4 x SATA Cables 4 x Hot-swap HDD trays 1 x Floppy Disk Drive 1 x Front I/O Board 1 x System RearFan (120mm x 38mm)	1 x 650W Redundant Power Supply 1 x SATA/SAS Backplane (BP4LX-T55) with 4 x SATA Cables 4 x Hot-swap HDD trays 1 x Floppy Disk Drive 1 x Front I/O Board 1 x System RearFan (120mm x 38mm)
Accessories	2 x CPU Coolers 1 x ASUS TS500-E5 User's Guide 1 x ASUS ASWM 2.0 User's Guide 1 x TS500-E5 Support CD (including ASWM*) 1 x Bag of Screws 1 x AC Power Cable	2 x CPU Coolers 1 x ASUS TS500-E5 User's Guide 1 x ASUS ASWM 2.0 User's Guide 1 x TS500-E5 Support CD (including ASWM*) 1 x Bag of Screws 1 x AC Power Cable
Optional Items	CA eTrust Anti-virus Software CD ASUS TS500-E5 Rackmount Rail Kit 4-bay HDD Cage ASUS PIKE RAID Card	CA eTrust Anti-virus Software CD ASUS TS500-E5 Rackmount Rail Kit 650W Redundant Power Supply Module 4-bay HDD Cage ASUS PIKE RAID Card

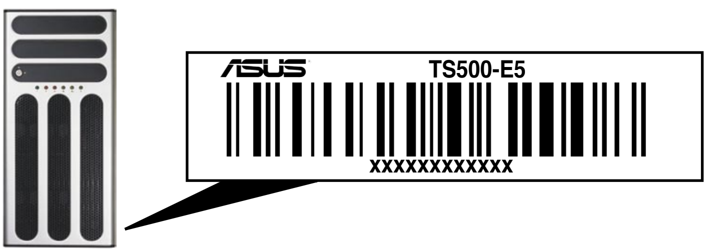
***ASUS System Web-based Management**

If any of the above items is damaged or missing, contact your retailer.

1.2 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 12 characters such as xxxxxxxxxxxx. See the figure below.

With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.



1.3 System specifications

The ASUS TS500-E5 is a 5U barebone server system featuring the ASUS DSAN-DX/TS500-E5 server board. The server supports Intel® LGA771 Xeon® 5100 / 5200 / 5300 / 5400 series processors with EM64T technology, plus other latest technologies through the chipsets onboard.

Model Name		TS500-E5/PA4	TS500-E5/RX8
Processor / System Bus		2 x Socket LGA771	
		Quad-Core Intel® Xeon® 5400 series Dual-Core Intel® Xeon® 5200 series Quad-Core Intel® Xeon® 5300 series Dual-Core Intel® Xeon® 5100 series	
		FSB 1066/1333 MHz EM64T	
Core Logic		Intel® 5100 Memory Controller Hub (MCH) Intel® ICH9R	
ASUS Features	Smart Fan	√	
	ASWM2.0	√	
Memory	Total Slots	6 (Dual-Channel)	
	Capacity	Maximum up to 24GB	
	Memory Type	DDR2 667 Registered ECC	
	Memory Size	512 MB, 1 GB, 2GB and 4GB	
Expansion Slots	Total PCI/PCI-X/ PCI-E Slots	5	
	Slot Type	**Workstation Mode:** 1 x PCI-E x16 slot (x16 link) 1 x PCI-E x8 slot (x8 link) 1 x PCI-E x8 slot (x4 link) or PIKE 1 x PCI 32-bit/33MHz slot **Server Mode:** 1 x PCI-E x16 slot (x8 link) 2 x PCI-E x8 slot (x8 link) 1 x PCI-E x8 slot (x4 link) or PIKE 1 x PCI 32-bit/33MHz slot	
	Additional Slot 1	1 x SO-DIMM socket	
	Additional Slot 2	1 x Proprietary slot for optional ASUS PIKE	
Storage	SATA Controller	**Intel® ICH9R:** 6 x SATA2 300MB/s ports Intel Matrix Storage (for Windows only) (Support software RAID 0, 1, 5 & 10) **LSI MegaRAID** (for Linux/Windows) (Support software RAID 0, 1 & 10)	
	SAS Controller	Optional: ASUS PIKE 1064E 4 port SAS card - Supports RAID 0, 1 and 1E ASUS PIKE 1078 8 port SAS card - Supports RAID 0, 1, 5, 10, 50, 6 and 60	

(continued on the next page)

Model Name		TS500-E5/PA4	TS500-E5/RX8
HDD Bays	I = internal A or S will be hot-swappable	**Default:** 4 x Hot-swap HDD Bays **Configuration Option:** 4-bay HDD Cage + 4 x Hot-swap HDD Trays	
Networking	LAN	2 x Broadcom® BCM5721 PCI-E GbE LAN	
Graphic	VGA	XGI Z9S VGA Controller / 32MB DDRII SDRAM	
Auxiliary Storage FDD / CD / DVD		1 x FDD 2 x 5.25" media bays (Options: No ODD/DVD-ROM/DVD-RW)	
Onboard I/O		1 x External Serial Port 2 x RJ-45 ports 4 x USB 2.0 ports (Front x 2, Rear x 2) 1 x VGA port 1 x PS/2 keyboard port 1 x PS/2 mouse port	
OS Support		Windows® Server 2003 R2 Enterprise 32/64-bit RedHat® Enterprise Linux AS5 UP1 32/64-bit SuSE® Linux Enterprise Server 10 SP1 32/64-bit (Subject to change without any notice)	
Anti-virus Software		CA® eTrust™ 7.1 anti-virus software (Optional)	
Management Solution		ASUS ASWM 2.0 and SNMP	
Dimension (HH x WW x DD)		450mm x 212mm x 550mm	
Net Weight Kg (CPU, DRAM & HDD not included)		20Kg	
Power Supply		670W Single Power Supply	650W 1+1 Redundant Power Supply
Environment		Operation temperature: 10°C ~ 35°C Non operation temperature: -40°C ~ 70°C Non operation humidity: 20% ~ 90% (Non condensing)	

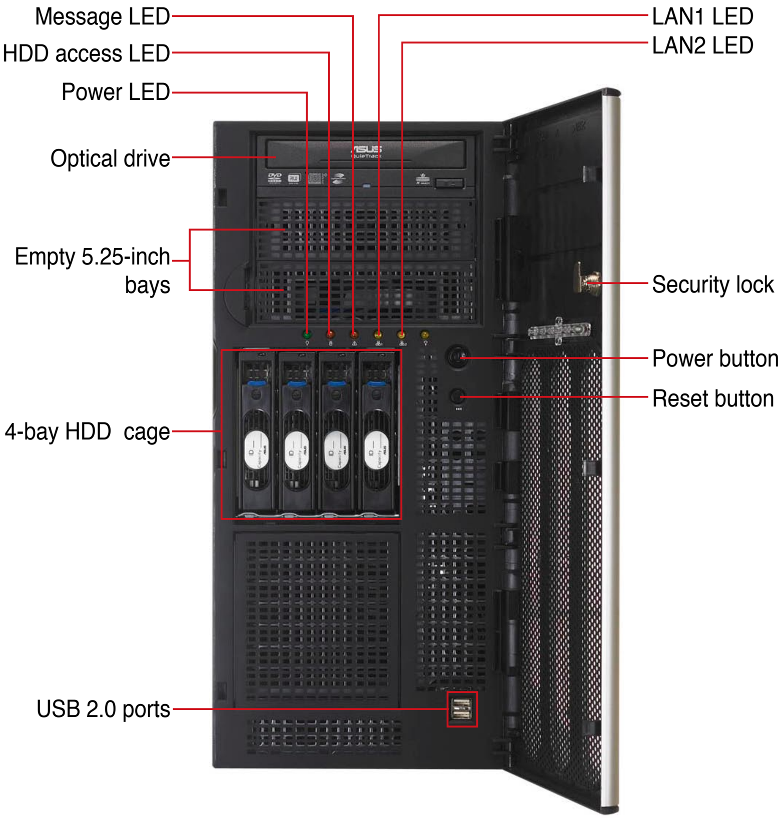
***Specifications are subject to change without notice.**

1.4 Front panel features

The barebone server displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators, optical drive, and two USB ports are located on the front panel.

The drive bays, power and reset buttons, LED indicators, CD/DVD-ROM drive, floppy drive, and USB 2.0 ports are located on the front panel. For future installation of 5.25-inch devices, two drive bays are available.

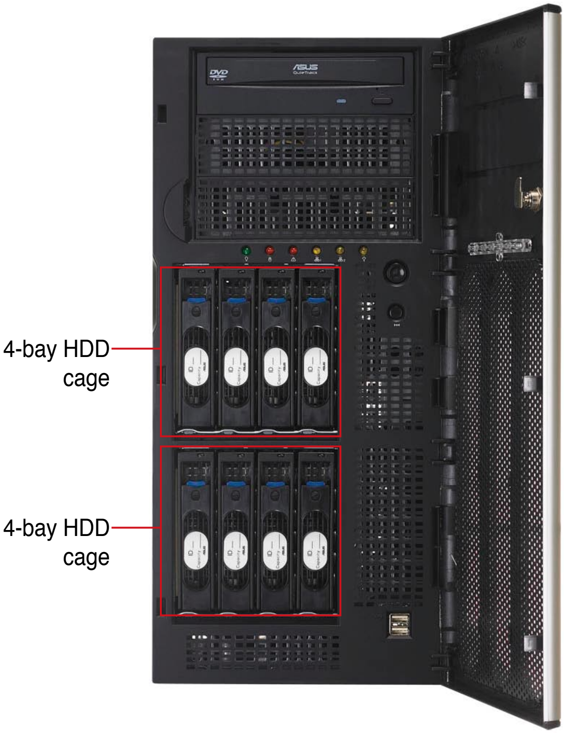
1.4.1 Four Hot-Swap HDD Devices





Refer to section **1.7.1 Front panel LEDs** for the LED descriptions.

1.4.2 Eight Hot-Swap HDD Devices

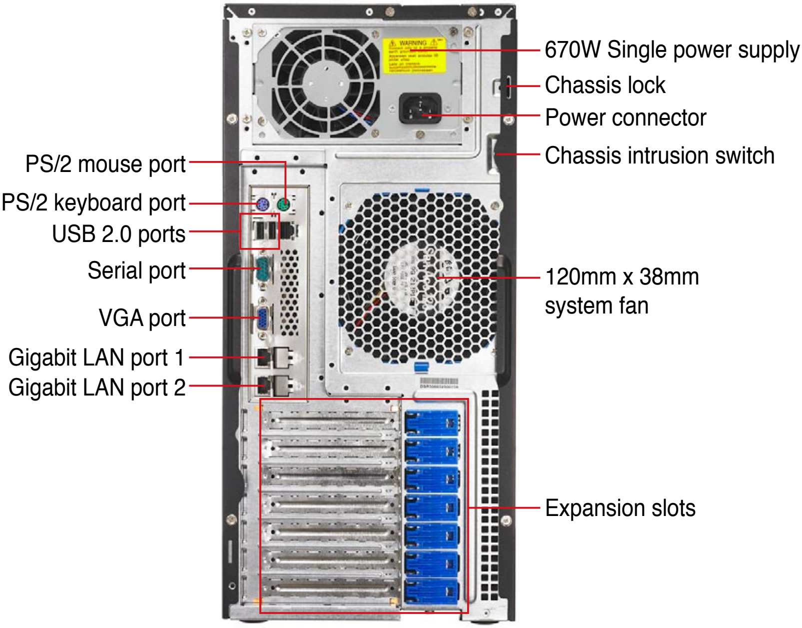


This server system provides 4-bay HDD Cage + 4 x Hot-swap HDD Trays as optional items.

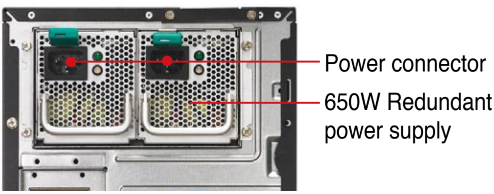
1.5 Rear panel features

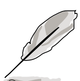
The rear panel includes a slot for the motherboard rear I/O ports, expansion slots, a chassis lock and intrusion switch, a vent for the system fan, and power supply module.

1.5.1 Single power supply (PA4 model)



1.5.2 Redundant Power Supply (RX8 model)

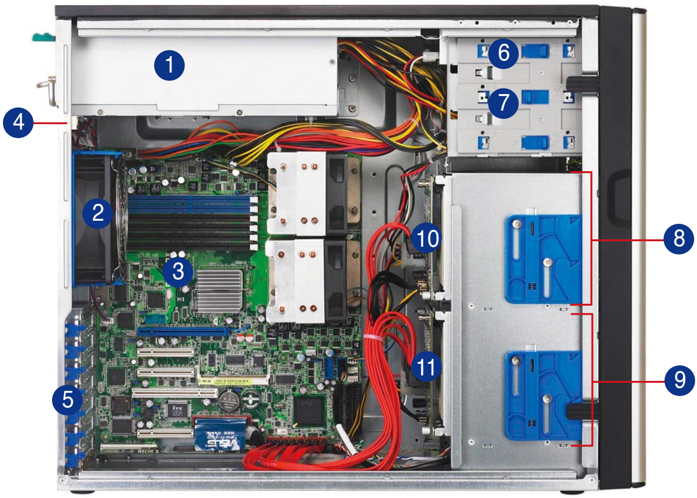




The second redundant power supply is an optional item.

1.6 Internal features

The barebone server includes the basic components as shown.



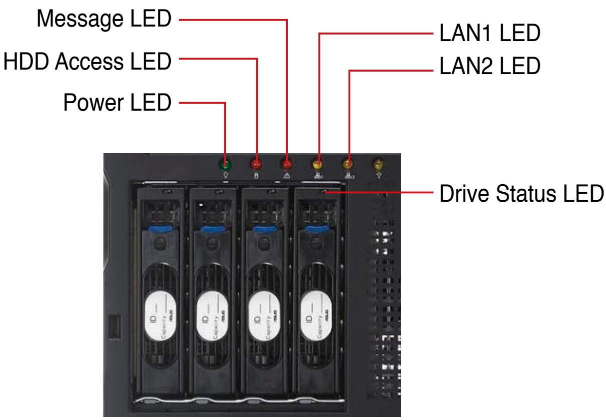
1. Power supply unit:

   PA4 model: 670W Single Power Supply

   RX8 model: 650W Redundant Power Supply (the second set is an optional item)
2. 120mm x 38mm system fan
3. ASUS DSAN-DX/TS500-E5 Server Board
4. Chassis intrusion switch
5. Expansion card locks
6. Optical drive
7. 2 x 5.25-inch drive bays
8. 4-bay HDD module (first set)
9. 4-bay HDD module (second set, optional)
10. SATA/SAS backplane board (first set, hidden)
11. SATA/SAS backplane board (second set, hidden)

1.7 LED information

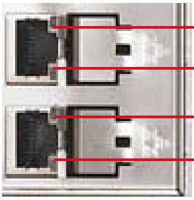
1.7.1 Front panel LEDs



LED	Icon	Display status	Description
Power LED		ON	System power ON
HDD Access LED		OFF Blinking	No activity Read/write data into the HDD
Message LED		OFF Blinking	System is normal; no incoming event ASWM indicates a HW monitor event
Drive status LED		Green Red Green/Red blinking	Bridge board connected to backplane Installed HDD is in good condition HDD failure HDD rebuilding using the RAID card
LAN LEDs		OFF Blinking ON	Read/write data into the HDD

The Power, HDD Access, LAN and Message LEDs are visible even if the system front bezel is closed.

1.7.2 Rear panel LEDs



ACT/LINK LED		SPEED LED	
Status	**Description**	**Status**	**Description**
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

Chapter 2

This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.



Hardware setup

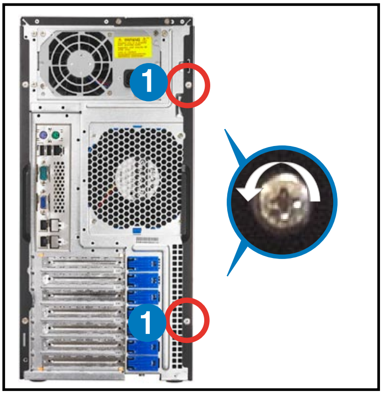
2.1 Chassis cover

2.1.1 Removing the side cover

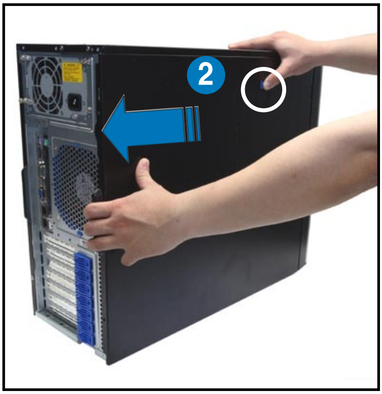
- Ensure that you unplug the power cord before removing the side cover.
- Take extra care when removing the side cover. Keep your fingers from components inside the chassis that can cause injury, such as the CPU fan, rear fan, and other sharp-edged parts.

To reinstall the side cover:

1. Remove the two screws that secure the side cover.



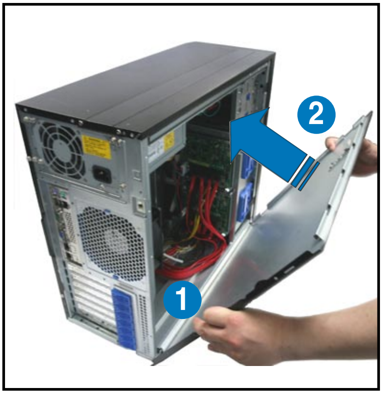
2. Press the blue latch button and slide the side cover for about half an inch toward the rear until it is disengaged from the chasssis.
3. Carefully lift the side cover and set it aside.



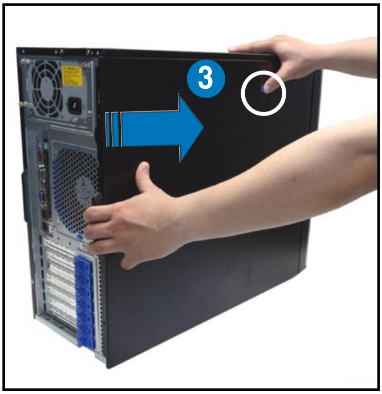
2.1.2 Reinstalling the side cover

To reinstall the side cover:

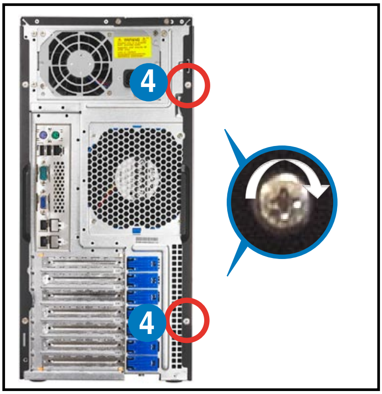
1. Match and insert the lower sliding edge of the side cover to the corresponding chassis edge.
2. Position the side cover to the chassis.



3. Press the blue latch button and slide the side cover toward the front panel until it snaps in place.



4. Drive in the two screws you removed earlier to secure the side cover.



2.2 Central Processing Unit (CPU)

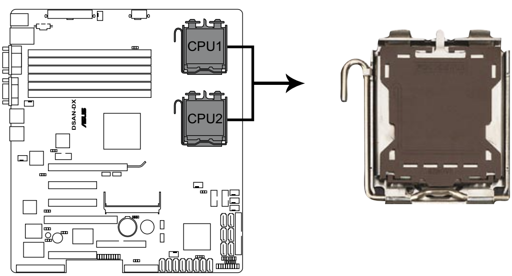
The motherboard comes with a surface mount LGA771 socket designed for the Intel® Xeon® Dual/Quad Core processor.

- Your boxed Intel® Xeon® LGA771 processor package should come with installation instructions for the CPU and heatsink. If the instructions in this section do not match the CPU documentation, follow the latter.
- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA771 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.
- If you install only one CPU, install the CPU to the CPU2 socket only. The system will not boot and the CPU warning LED will light up if a single CPU is installed on the CPU1 socket.

2.2.1 Installing the CPU

To install a CPU:

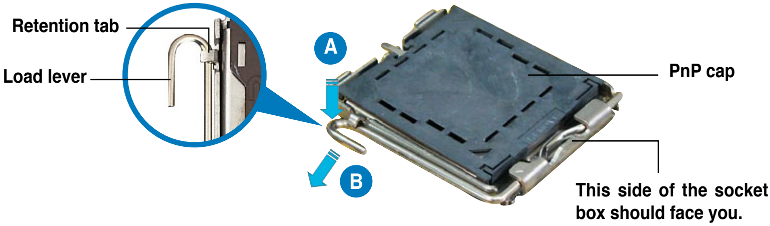
1. Locate the CPU socket on the motherboard.



DSAN-DX/TS500-E5 CPU LGA771

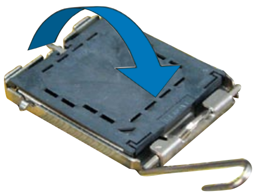
Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

2. Press the load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.

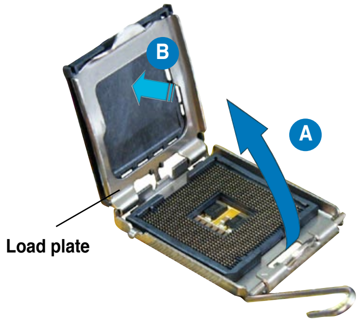


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

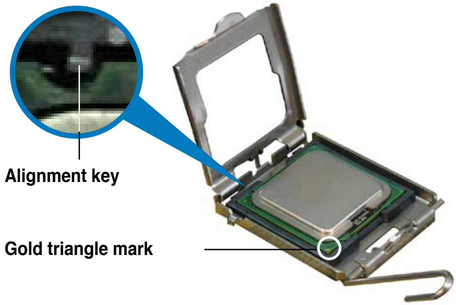
3. Lift the load lever in the direction of the arrow to a 135º angle.



4. Lift the load plate with your thumb and forefinger to a 100º angle (A), then push the PnP cap from the load plate window to remove (B).

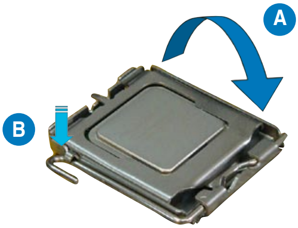


5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.



The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

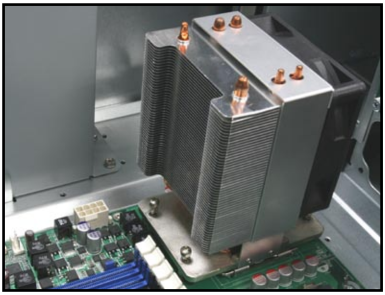
6. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab.



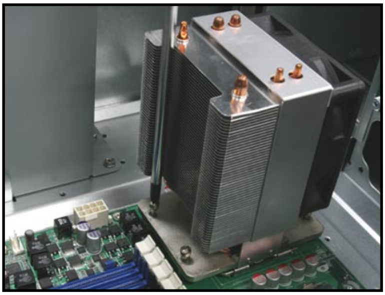
2.2.2 Installing the CPU heatsink and fan

To install the CPU heatsink and fan:

1. Place the CPU heatsink and fan on top of the installed CPU, making sure that the four screws match the holes on the support plate.

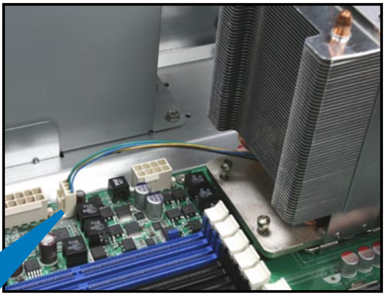


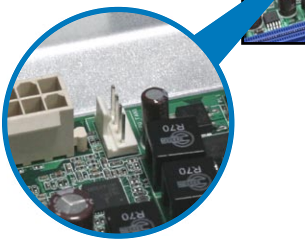
2. Twist each of the four screws with a Philips (cross) screwdriver just enough to attach the CPU heatsink and fan to the motherboard. When the four screws are attached, tighten them one by one to completely secure the CPU heatsink and fan.



3. Connect the CPU heatsink and fan cable to the connector on the motherboard.

Do not forget to connect the CPU heatsink and fan connector! Hardware monitoring errors can occur if you fail to plug this connector.





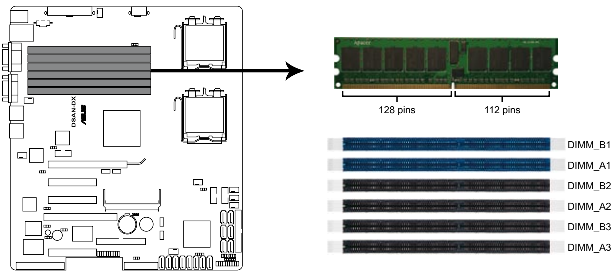
2.3 System memory

2.3.1 Overview

The motherboard comes with six (6) Double Data Rate 2 (DDR2) Dual Inline Memory Modules (DIMM) sockets.

A DDR2 module has the same physical dimensions as a DDR DIMM but has a 240-pin footprint compared to the 184-pin DDR DIMM.

The figure illustrates the location of the DDR2 DIMM sockets:`



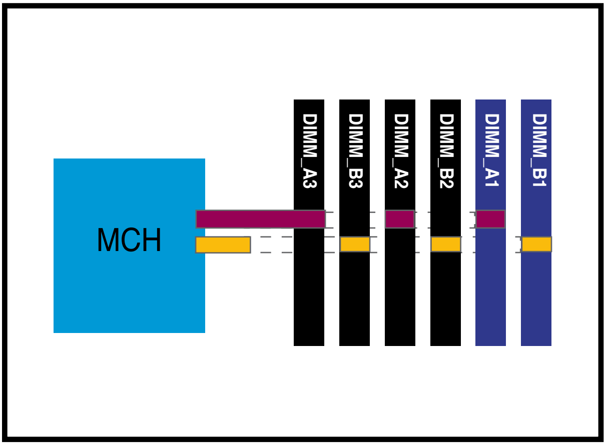
DSAN-DX/TS500-E5 240-pin DDR2 DIMM sockets

2.3.2 Memory configurations

You may install 512 MB, 1 GB, 2 GB, and 4 GB registered ECC DIMMs into the DIMM sockets.

- For optimum compatibility, we recommend that you obtain memory modules from the same vendor. Refer to the Qualified Vendors List on the ASUS web site.
- This motherboard does not support memory modules made up of 128 Mb chips x16 memory modules.
- If you are installing only one memory module, install the module into the blue socket labeled DIMM_A1 or DIMM_B1. Installing into any other socket will not work.

Rank population



DIMM installation reference table

No. of DIMMs	Slot/s to use
1	DIMM_B1 or DIMM_A1
2	DIMM_B1, DIMM_A1
4	DIMM_B1, DIMM_A1, DIMM_B2, DIMM_A2
6	DIMM_B1, DIMM_A1, DIMM_B2, DIMM_A2 DIMM_B3, DIMM_A3

- DIMMs in pair means two DIMMs with the same configuration.
- For better performance, same configuration DIMMs should be installed on the same slot number for each channel. For example, you may install the same type of DIMMs in DIMM_B1, and DIMM_A1.

2.3.3 Memory mirroring and sparing technology

The Intel® 5100MCH chipset supports the memory sparing technology. Refer to the below section:

Memory Sparing

At configuration time, a DIMM rank is set aside to replace a defective DIMM rank. When the error rate for a failing DIMM rank reaches a pre-determined threshold, the memory sparing function will issue an interrupt and initiate a spare copy. At the completion of the copy, the failing DIMM rank is disabled and the “spared” DIMM rank will be used in its place. Refer to section **5.4.3 Chipset** and configure the options of **Channel Rank Sparing** or **Channel 1 Rank Sparing** to enable the memory sparing functions. The default BIOS setting is disabled.

- Each channel contains its own sparing engine and can be enabled or disabled separately.
- This motherboard does not support rank sparing across channels.
- The DIMM rank with the largest size will be assigned as spare rank. Data can only be copied from a smaller sized rank to a larger sized one.
- A DIMM can contain only one or two ranks. To support sparing function, a DIMM channel should contain at least two ranks.
- When sparing function is enabled, the usable memory size will reduce the size of the spare ranks.

The following tables show memory configurations with Memory Sparing function in Channel A/B.

One DIMM per channel (two ranks)

	Channel B		Channel A	
	DIMM_B1 (1024MB*2 Ranks)		DIMM_A1 (1024MB*2 Ranks)	
	Rank 0 (1024 MB)	Rank 1 (1024 MB)	Rank 0 (1024 MB)	Rank 1 (1024 MB)
Sparing		●		●
Memory space	1024 MB		1024 MB	
Total Memory	2048 MB			

Two DIMMs per channel

	Channel B		Channel A	
	DIMM_B1 (512MB*2 Ranks)		DIMM_A1 (512MB*2 Ranks)	
	Rank 0 (512 MB)	Rank 1 (512 MB)	Rank 0 (512 MB)	Rank 1 (512 MB)
Sparing				
Memory space	1024 MB		1024 MB	
	DIMM_B2 (1024MB*2 Ranks)		DIMM_A2 (1024MB*2 Ranks)	
	Rank 0 (1024 MB)	Rank 1 (1024 MB)	Rank 0 (1024 MB)	Rank 1 (1024 MB)
Sparing		●		●
Memory space	1024 MB		1024 MB	
Total Memory	4096 MB			

Three DIMMs per channel

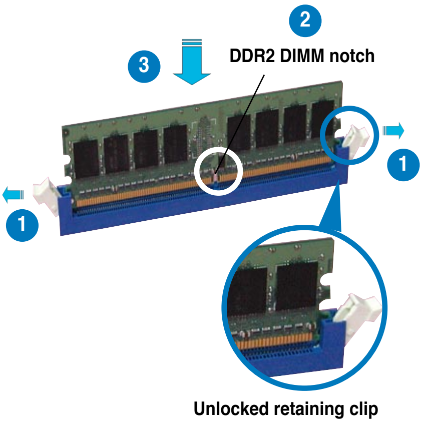
	Channel B		Channel A	
	DIMM_B1 (512MB*2 Ranks)		DIMM_B1 (512MB*2 Ranks)	
	Rank 0 (512 MB)	Rank 1 (512 MB)	Rank 0 (512 MB)	Rank 1 (512 MB)
Sparing				
Memory space	1024 MB		1024 MB	
	DIMM_B2 (1024MB*2 Ranks)		DIMM_A2 (1024MB*2 Ranks)	
	Rank 0 (1024 MB)	Rank 1 (1024 MB)	Rank 0 (1024 MB)	Rank 1 (1024 MB)
Sparing				
Memory space	2048 MB		2048 MB	
	DIMM_B3 (2048MB*2 Ranks)		DIMM_A3 (2048MB*2 Ranks)	
	Rank 0 (2048 MB)	Rank 1 (2048 MB)	Rank 0 (2048 MB)	Rank 1 (2048 MB)
Sparing		●		●
Memory space	2048 MB		2048 MB	
Total Memory	10240 MB			

2.3.4 Installing a DIMM

Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

To install a DIMM:

1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



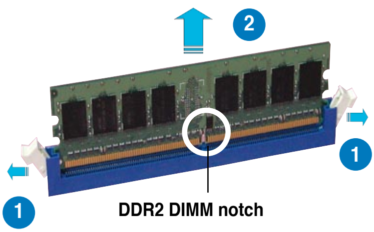
- A DDR2 DIMM is keyed with a notch so that it fits in only one direction. Do not force a DIMM into a socket to avoid damaging the DIMM.
- The DDR2 DIMM sockets do not support DDR DIMMs. Do not install DDR DIMMs to the DDR2 DIMM sockets.

2.3.5 Removing a DIMM

To remove a DIMM:

1. Simultaneously press the retaining clips outward to unlock the DIMM.

Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.



2. Remove the DIMM from the socket.

2.4 Front panel assembly

Before you can install a 5.25-inch drive, you should first remove the front panel assembly (front bezel and front panel cover).

2.4.1 Removing the front panel assembly

To remove the front panel assembly:

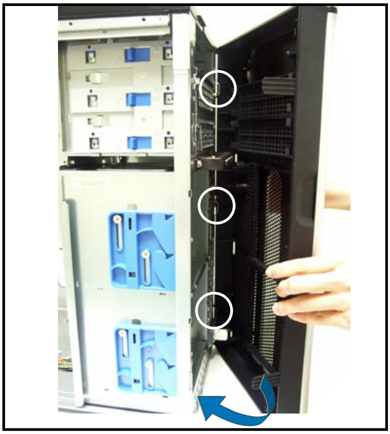
1. Unlock the front door if needed.
2. Locate the two hooked tabs on the chassis side rail.
3. Shift the hooked tabs and take off the front bezel.



2.4.2 Reinstalling the front panel assembly

To reinstall the front panel assembly:

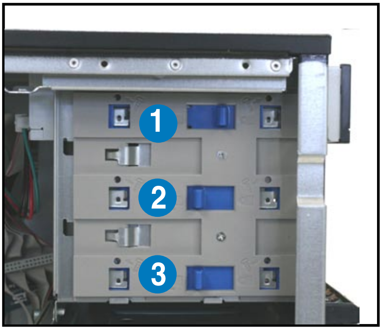
1. Hook the other side of the front panel assembly to the chassis.
2. Swing the front panel assembly and snap it back into place.



2.5 5.25-inch or 3.5-inch drives

Ensure to unplug the power cable before installing or removing any system components. Failure to do so may cause damage to the motherboard and other system components!

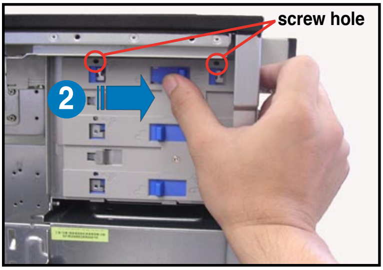
The system comes with three 5.25-inch drive bays located on the upper front part of the chassis. You can use the bay converter that comes with the package to convert the 5.25-inch bay to 3.5-inch bay for 3.5-inch device such as floppy disk drives.



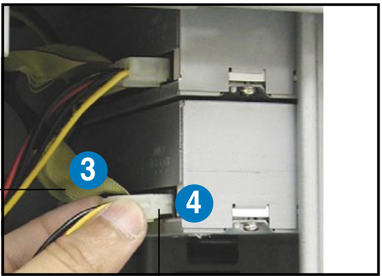
You must remove the front panel assembly before installing a 5.25-inch drive.

2.5.1 Installing a 5.25-inch drive

1. Unscrew and remove the metal cover of the bay where you want to install the 5.25-inch drive, and take off the plastic cover on the front bezel at the same position.
2. Insert the drive into the bay and slide the bay lock to the right until it clicks in place. Screw to double secure the drive.

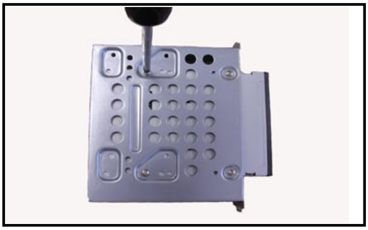


3. Connect the IDE cable to the IDE connector on the back of the drive.
4. Connect a 4-pin plug from the power supply to the power connector on the back of the drive.

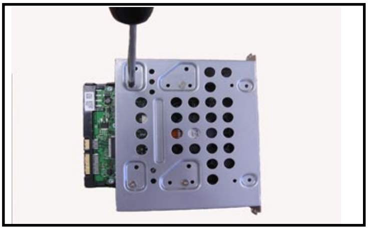


2.5.2 Installing a 3.5-inch drive

1. Remove the metal bracket in front of the drive bay converter.
2. Install the 3.5-inch disk drive into the converter.
3. Screw the 3.5-inch disk drive on the bay converter.



3.5" Floppy disk drive



3.5" Hard disk drive

4. Insert the converter installed with 3.5-inch disk drive into the chassis and secure it as the 5.25-inch drives.

2.6 SATA/SAS hard disk drives

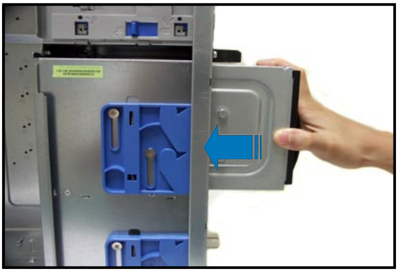
The optional two hard disk drive modules on the front panel, including externally removable trays for mounting either SATA or SAS hard disk drives, allow you to access the drive trays by simply opening the the front bezel.

A hot-swap HDD module cage comes with a SATA or SATS backplane. Make sure of the type of HDD module cage you purchase before buying hard disks.

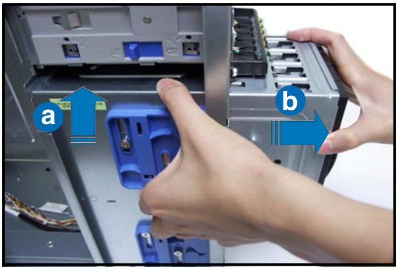
2.6.1 Hot-swap HDD module

To install the hot-swap HDD module:

1. Examine the chassis and make sure the bay space is free of wires and other obstructions.
2. Insert the hot-swap HDD module into the bay.

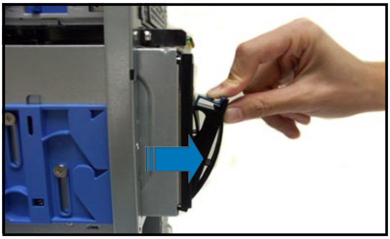


3. To remove the hot-swap HDD module, lift up the blue latch (a), then pull out the hot-swap HDD module (b).

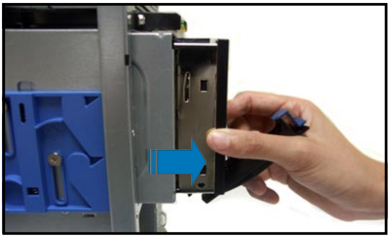


To install a SATA/SAS hard disk drive:

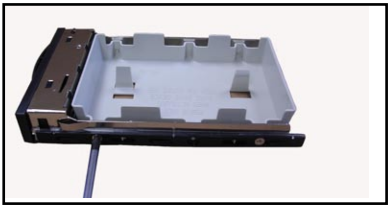
1. Pull down the tray lever until the tray pops out slightly, indicating that it is released.



2. Holding on the tray lever, pull out the HDD tray from the bay.



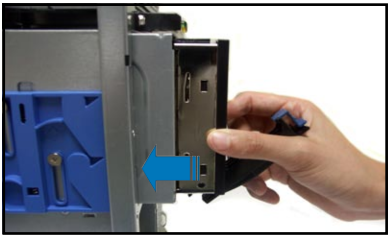
3. Unscrew and remove the blank tray from the frame.



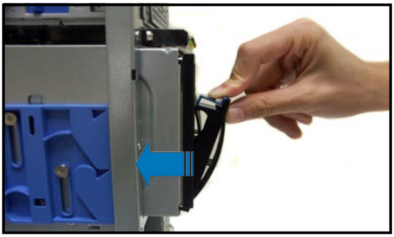
4. Place a hard disk drive on the tray and secure it with four screws.



5. Insert the HDD-installed tray back into the bay.
6. Carefully push the tray all the way to the depth of the bay.



7. Push the tray lever until it clicks in place. The drive tray is correctly placed when its front edge aligns with the bay edge.

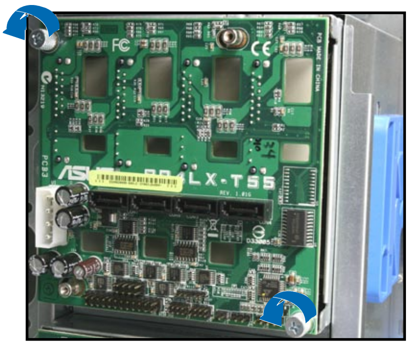


Removing and reinstalling the backplane

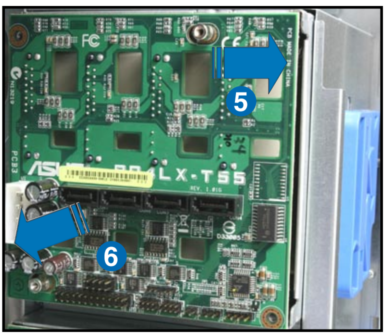
DO NOT remove the backplane unless necessary!

1. Remove the hot-swap HDD module from the bay if it has been installed.
2. Pull down the tray lever until the tray pops out slightly, indicating that it is released.
3. Repeat the previous step to release all the installed disk drives.

4. Loosen both screws with a screw driver or your fingers.



5. Push the backplane outward so that the outer edge protrudes slightly from the slot.
6. Hold on to the backplane, lift it up and remove it from the module.



7. Follow the previous instructions in reverse to reinstall the backplane.

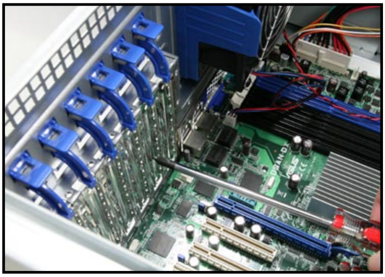
2.7 Expansion cards

The system is designed with an expansion card lock on the rear panel for you to install or remove an expansion card in less steps.

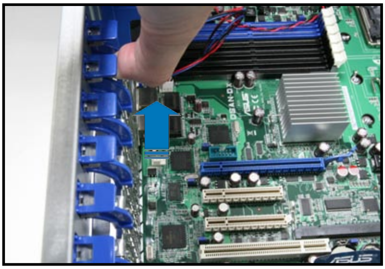
Ensure to unplug the power cord before installing or removing expansion cards. Failure to do so may cause severe damage to the motheboard and other system components!

2.7.1 Installing an expansion card

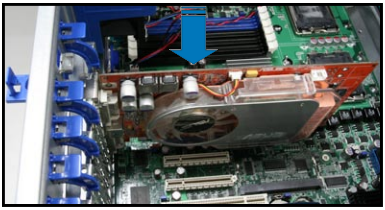
1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Lay the system on its side on a flat, stable surface.
3. Use a Phillips screw driver to remove the metal slot cover opposite the slot where you wish to install an expansion card.



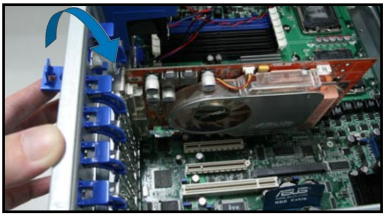
4. Lift the expansion card lock.



5. Align the card golden fingers with the slot, and then press firmly until the card is completely seated on the slot.



6. Restore the expansion card lock to its original position. A light click indicates that the card is locked in place.

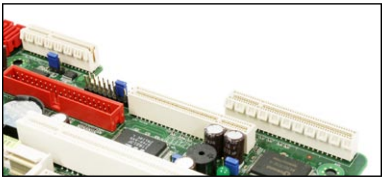


When installing a graphics card on PCI-E x16 slot, the PCI-E slot right beside it does not function.

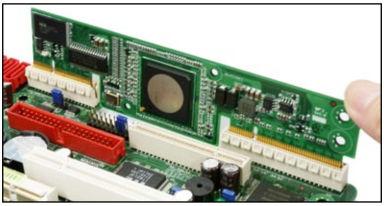
2.7.2 Installing ASUS PIKE RAID card

Follow the steps below to install an optional ASUS RAID card on your motherboard.

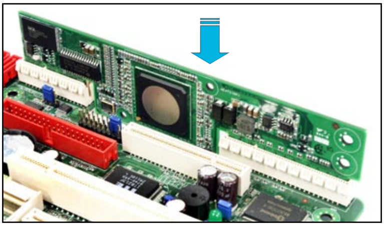
1. Locate the PIKE RAID card slot on the motherboard.



2. Align the golden fingers of the RAID card with the PIKE RAID card slot.



3. Insert the RAID card into the PIKE RAID card slot. Make sure it is completely seated on the PIKE RAID card slot.



When installing a PIKE RAID card on the PIKE RAID card slot, the PCI-E slot right beside it does not function.

2.7.3 Configuring an expansion card

After installing the expansion card, configure the it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 5 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the following tables.
3. Install the software drivers for the expansion card.

Standard Interrupt assignments

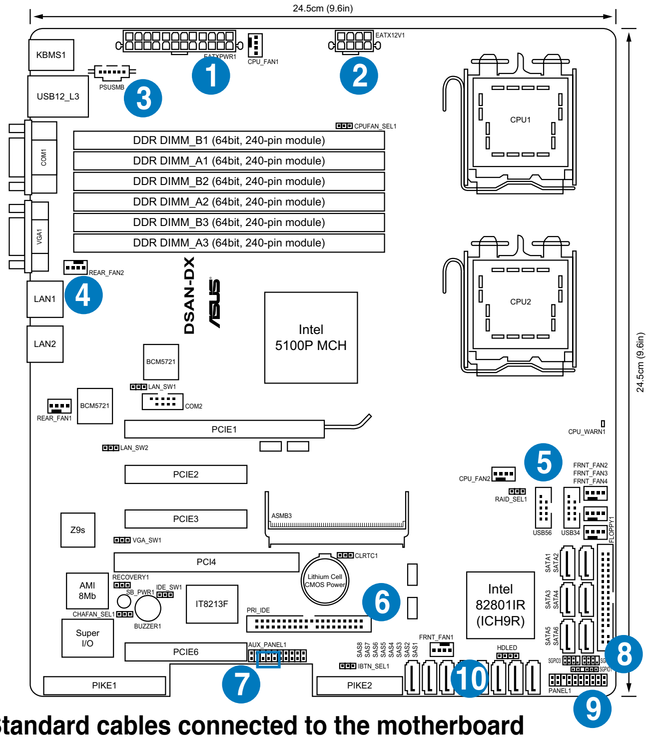
IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	--
6	14	Floppy Disk Controller
7*	15	--
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when used
10*	5	IRQ Holder for PCI Steering
11*	6	IRQ Holder for PCI Steering
12*	7	PS/2 Compatible Mouse Port
13	8	Numeric Data Processor
14*	9	Primary IDE Channel
15*	10	Secondary IDE Channel

* These IRQs are usually available for ISA or PCI devices.

2.8 Cable connections

- The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.
- Refer to Chapter 4 for detailed information on the connectors.

2.8.1 Motherboard connections



Standard cables connected to the motherboard

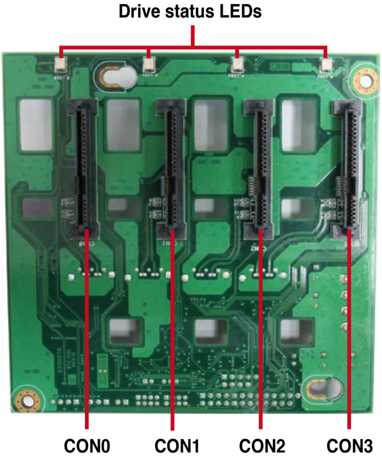
1. 24-pin ATX power connector (from power supply to motherboard)
2. 8-pin 12V power connector (from power supply to motherboard)
3. Power supply SMBus connector (from power supply to motherboard)
4. System fan connectors (from system fan to motherboard)
5. USB connector (from motherboard to front I/O board)
6. IDE connector (from motherboard to the optional drive)
7. Chassis Intrusion connector (from rear chassis intrusion switch to motherboard)
8. Serial General Purpose Input/Output connectors
   (SATA: from motherboard SGPIO1 to SATA/SAS backplane J2 connector
   SAS: from motherboard SGPIO2 to SATA/SAS backplane J6 connector
   SAS: from motherboard SGPIO3 to SATA/SAS backplane J7 connector)
9. System panel connector (from motherboard to front I/O board)
10. SAS connectors (for ASUS PIKE only; from motherboard to SATA/SAS backplane)

2.8.2 SATA/SAS backplane connections

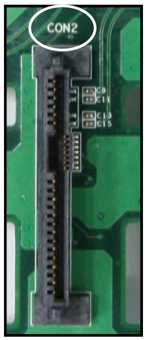
A SATA/SAS backplane comes pre-installed in the TS500-E5. The SATA/SAS backplane has four 22-pin SATA/SAS connectors to support Serial ATA hard disk drives and SAS hard disk drives. The backplane design incorporates a hot swap feature to allow easy connection or removal of SATA/SAS hard disks. The LEDs on the backplane connect to the front panel LEDs to indicate HDD status. See section "1.6 LED information" for details.

Front side

The front side of the SATA/SAS backplane faces the front panel when installed. This side includes four SATA/SAS connectors for the hot swap drive trays.



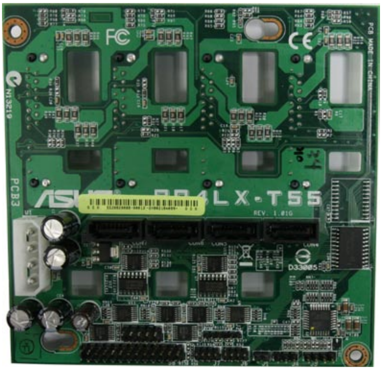
Each SATA/SAS connector is labeled (CON0, CON1, CON2, CON3) so you can easily determine their counterpart connectors at the back side of the backplane. Refer to the table for reference.



HDD Device	Front side connector	Back side connector
HDD 1	CON0	CON4
HDD 2	CON1	CON5
HDD 3	CON2	CON6
HDD 4	CON3	CON7

Back side

The back side of the SATA/SAS backplane faces the rear panel when installed. This side includes the power connectors and SATA/SAS interfaces for the motherboard Serial ATA connectors or the SAS card.



Connectors	Description
J2	Connects to SATA SGPIO1 connector on the motherboard
J6	Connects to SAS SGPIO2 connector on the motherboard
J7	Connects to SAS SGPIO3 connector on the motherboard
J8	Links backplane1 and backplane2 signals
J10	Links to add-on card failed LED signal
U1	Connects to 4-pin plug of the power supply
CON4/CON5/ CON6/CON7	Connects to SATA/SAS connectors on the motherboard

2.9 Removable components

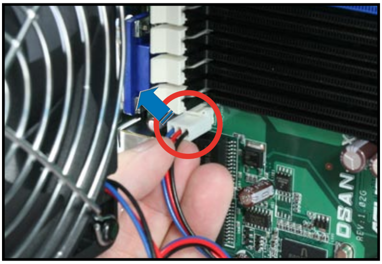
You may need to remove previously installed system components when installing or removing system devices, or when you need to replace defective components. This section tells how to remove the following components:

1. System fan
2. Chassis footpads
3. Power supply unit

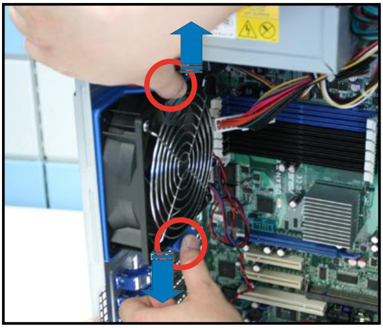
2.9.1 System fan

To remove the system fan:

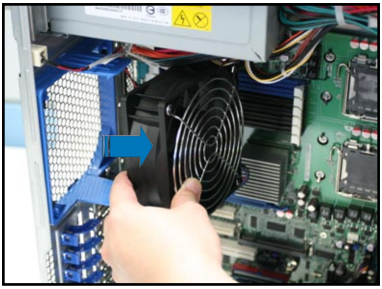
1. Unplug the system fan cable from the REAR_FAN2 connector on the motherboard.



2. Shift the two hooked tabs upward and downward.

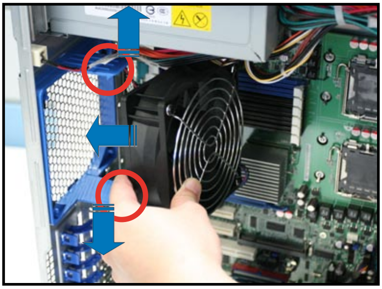


3. Carefully take off the system fan.

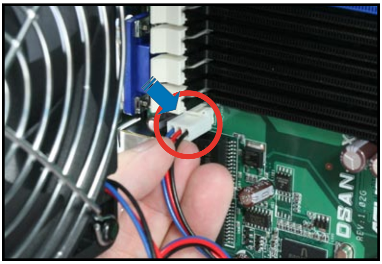


To reinstall the system fan:

1. Shift the two hooked tabs upward and downward, and then install the system fan. A light click indicates that the system fan is secured in place.



2. Plug the system fan cable to the REAR_FAN2 connector on the motherboard.

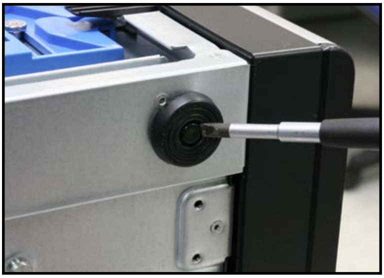


2.9.2 Chassis footpads

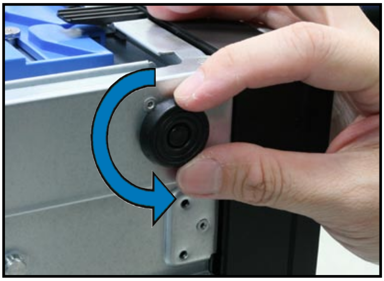
The barebone server system is shipped with four footpads attached to the bottom of the chassis for stability. You need to remove these footpads if you wish to install the system to a rack (Refer to **Chapter 3: Installation options** of this user guide, and to the "Rackmount Kit" user guide for instructions)

To remove the footpads:

1. Lay the system chassis on its side.
2. Use a flat screwdriver to flip out the top layer of a footpad.



3. Remove the footpad by rotating it counterclockwise.



4. Repeat steps 2 and 3 to remove the other three footpads.

2.9.3 Power supply unit

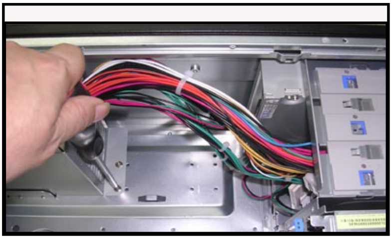
The system is compatible with both EPS 12 V 670 W single power supply and 650 W redundant power supply. Purchase based on your needs.

> You MUST disconnect all power cable plugs from the motherboard and other installed devices before removing the power supply unit.

Installing the single power supply unit



1. Align the single power supply unit (PSU) in the chassis with the four mounting screw holes.
2. Make the PSU sit on the shelf ledge when fastening it to the chassis with screws.



3. Fasten the two screws on the chassis wall.

Installing the redundant power supply module

1. Unscrew and remove the power supply brackets at the back and on the chassis wall.
2. Screw the metal bracket from the chassis wall to the redundant power supply cage.



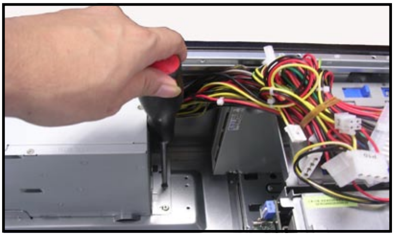
3. Insert the redundant power supply into the power supply bay.



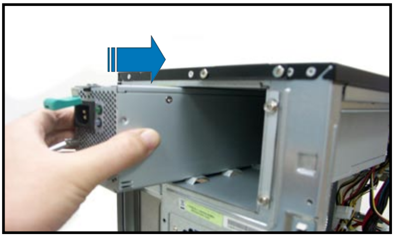
4. Make the redundant power supply cage sit on the shelf ledge when fastening it to the chassis with screws.



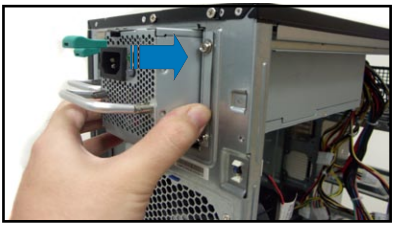
5. Fasten the two screws on the chassis wall.



6. Slide the power supply module into the bay, and press until the release/ lock lever clicks to lock the module securely.



7. Install the other redundant power supply module as the first one.



Chapter 3

This chapter describes how to install the optional components and devices into the barebone server.



Installation options

3.1 Preparing the system for rack mounting

- The items required for the optional configurations described in this chapter are not included in the standard barebone system package. These items are purchased separately.
- We recommend that you allot at least 1U space above the server system to ensure optimal thermal performance.

Removing the footpads

Refer to section **2.9.2 Chassis footpads** for instructions on removing the footpads.

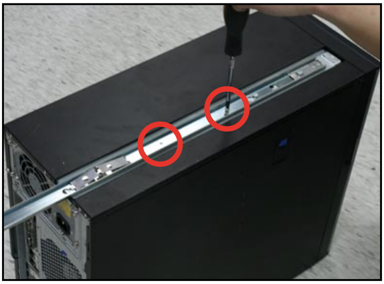
Removing the top cover

Unscrew and slide the top cover toward the rear panel, and then lift it up from the chassis.

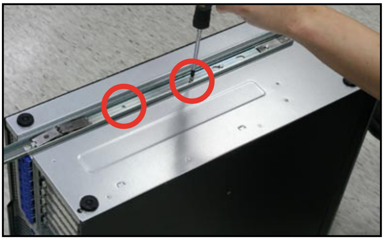


3.2 Attaching the inner rail to the server

1. Slide out the inner rail from the rackmount rail kit.
2. Align the screw holes on the inner rail and the chassis top, and then secure the inner rail to the chassis top with screws.



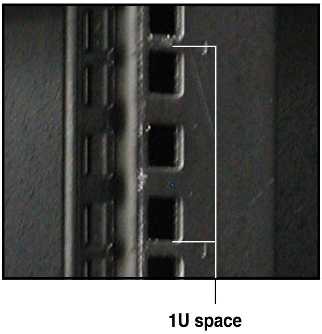
3. Repeat the previous steps to secure the other inner rail to the bottom of the chassis with screws.



3.3 Attaching the rails to the rack

To attach the rails to the rack:

1. Select one unit of space (1U) on the rack where you wish to install the server.



2. Loosen the two screws on the rack rails.



3. Align the front end holes of a rack rail pair to the 1U space.
4. Drive in two screws on the outer holes to secure the front end.

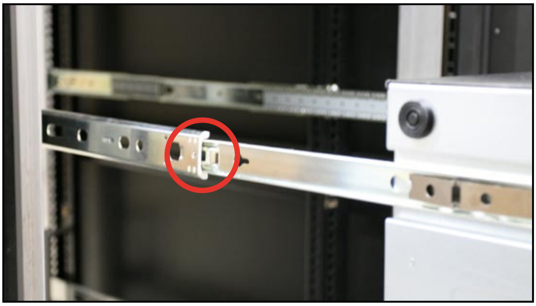


5. Find the rear 1U space that corresponds to the front 1U space where you attached the rail.
6. Drive in two screws on the outer holes to secure the rear end.
7. From the rack front, find the corresponding 1U space for the second rail pair.
8. Repeat steps 3–6 to attach the second rail pair.

3.4 Mounting the server to the rack

To mount the server to the rack:

1. Align the server rails with the rack rails.



2. Push the server all the way into the rack.



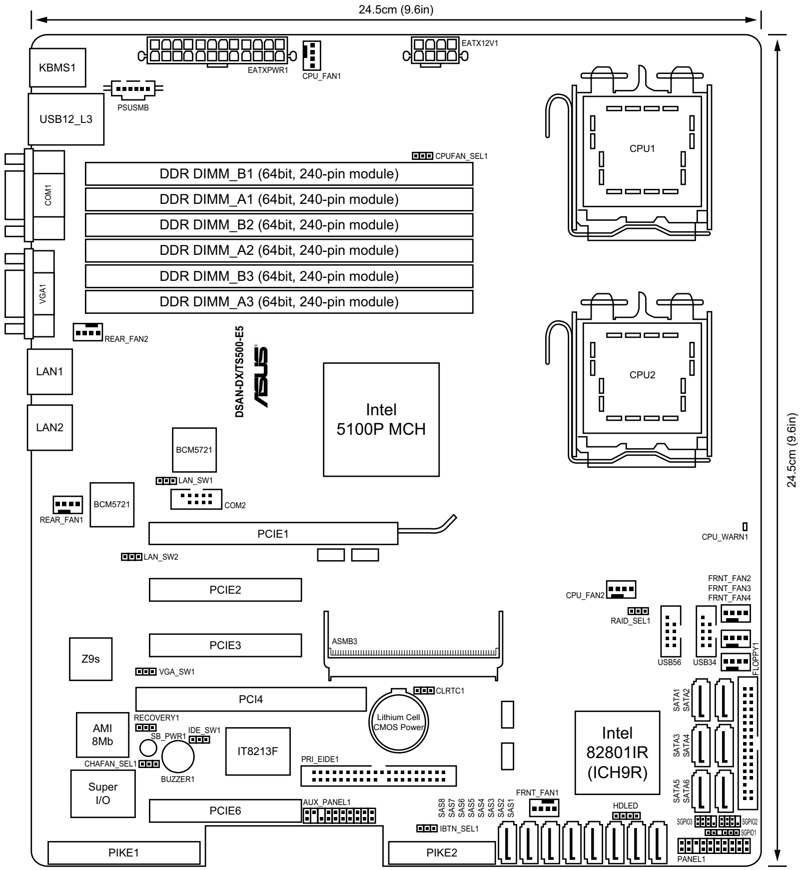
Chapter 4

This chapter includes the motherboard layout, and brief descriptions of the jumpers and internal connectors.



Motherboard info

4.1 Motherboard layout



Layout contents

4.2 Jumpers

1. Clear RTC RAM (CLRTC1)

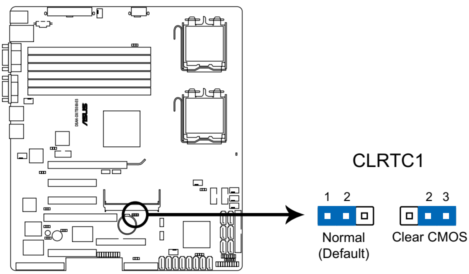
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

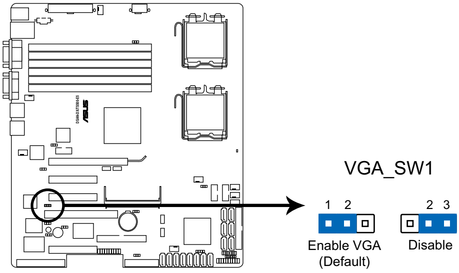
If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.



DSAN-DX/TS500-E5 Clear RTC RAM

2. VGA controller setting (3-pin VGA_SW1)

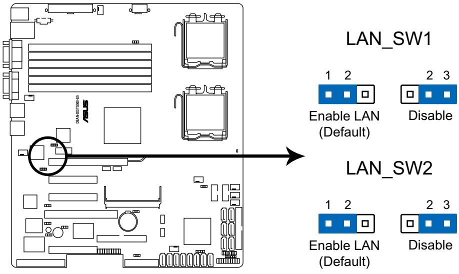
This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1–2 to activate the VGA feature.



DSAN-DX/TS500-E5 VGA setting

3. LAN controller setting (3-pin LAN_SW1, LAN_SW2)

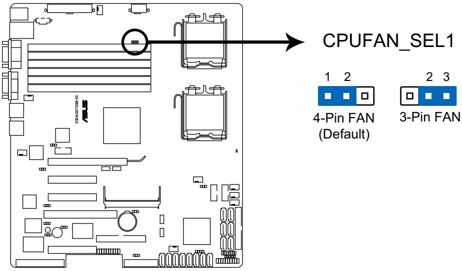
These jumpers allow you to enable or disable the onboard Broadcom® BCM5721 Gigabit LAN1/2 controller. Set to pins 1–2 to activate the Gigabit LAN feature.



DSAN-DX/TS500-E5 LAN setting

4. **CPU Fan control setting (3-pin CPUFAN_SEL1)**

This jumper allows you to switch for fan pin selection. The CPUFAN_SEL1 jumper is for the CPU fans control. Set to pins 1–2 when using 4-pin fans or pins 2–3 when using 3-pin fans.

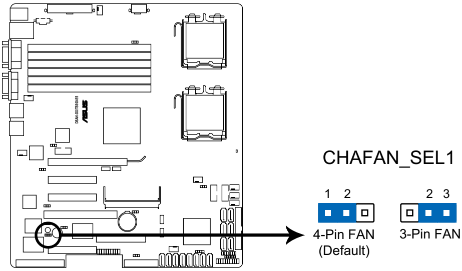


DSAN-DX/TS500-E5 CPUFAN setting

- If you use a 4-pin fan but set the jumper to pin 2-3, the fan you installed may not work.
- If you use a 3-pin fan but set the jumper for a 4-pin fan, the fan controll will not work and the fan you installed will always run at full speed.

5. **System Fan control setting (3-pin CHAFAN_SEL1)**

This jumper allows you to switch for fan pin selection. The CHAFAN_SEL1 jumper is for the system fans control. Set to pins 1–2 when using 4-pin fans or pins 2–3 when using 3-pin fans.

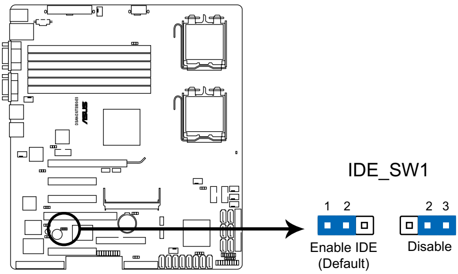


DSAN-DX/TS500-E5 CHAFAN setting

- If you use a 4-pin fan but set the jumper to pin 2–3, the fan you installed may not work.
- If you use a 3-pin fan but set the jumper for a 4-pin fan, the fan controll will not work and the fan you installed will always run at full speed.

6. **IDE setting (3-pin IDE_SW1)**

This jumper allows you to enable or disable the onboard IDE connector. Set to pins 1–2 to activate the IDE connector.



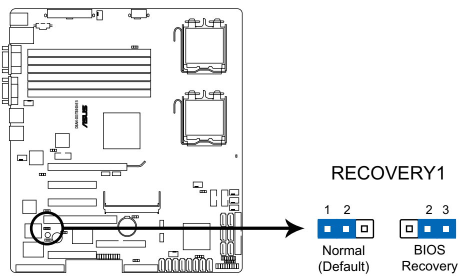
DSAN-DX/TS500-E5
IDE setting

7. **Force BIOS recovery setting (3-pin RECOVERY1)**

This jumper allows you to quickly update or recover the BIOS settings when it becomes corrupted.

To update the BIOS:

1. Prepare a floppy disk that contains the original or latest BIOS for the motherboard (XXXXXX.ROM) and the AFUDOS.EXE utility.
2. Set the jumper to pins 2–3.
3. Insert the floppy disk then turn on the system to update the BIOS.
4. Shut down the system.
5. Set the jumper back to pins 1–2.
6. Turn on the system.

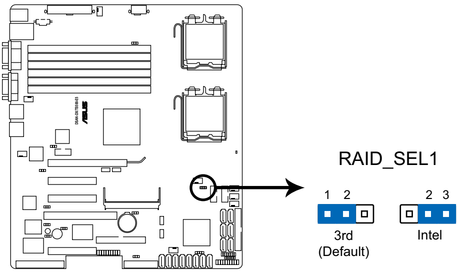


DSAN-DX/TS500-E5
BIOS recovery setting

Use the AFUDOS uitility version 3.12 to flash the BIOS.

8. **Intel® ICH9R SATA port S/W RAID setting (3-pin RAID_SEL1)**

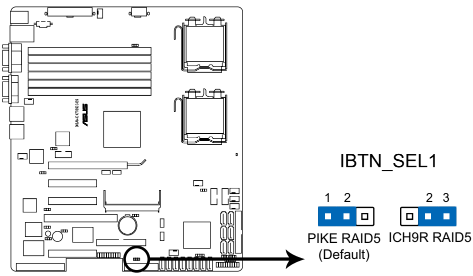
This jumper allows you to select the Serial ATA RAID configuration utility to use when you create disk arrays. Both utilities are supported by the Intel® ICH9R. Place the jumper caps on pins 1–2 if you want to use the LSI Software RAID Configuration Utility (default); otherwise, place the jumper caps on pins 2–3 to use the Intel® Matrix Storage Manager (IMSM).



DSAN-DX/TS500-E5 RAID setting

9. **iBTN RAID setting (3-pin IBTN_SEL1)**

This jumper allows you to select the RAID configuration utility to use when you create disk arrays. Place the jumper caps on pins 1–2 if you install a PIKE RAID card to the motherboard and want to use the LSI Logic MPT Setup Utility (default). Or you can place the jumper caps on pins 2–3 to create the LSI Mega RAID 5 by supported Intel® ICH9R SATA controller.



DSAN-DX/TS500-E5 IBTN setting

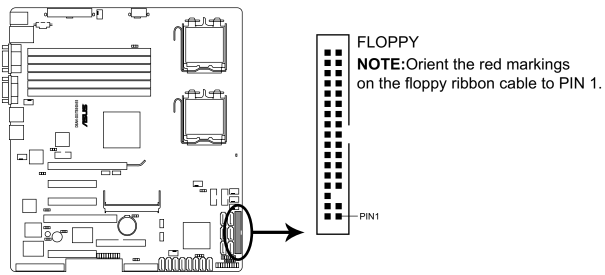
- LSI Logic MPT Setup Utility is available only when you install a PIKE RAID card.
- LSI Mega RAID 5 fucntion is available only when you place the iBTN to I_BTN1 socket.

4.3 Internal connectors

1. Floppy disk drive connector (34-1 pin FLOPPY1)

This connector is for the provided floppy disk drive (FDD) signal cable. Insert one end of the cable to this connector, then connect the other end to the signal connector at the back of the floppy disk drive.

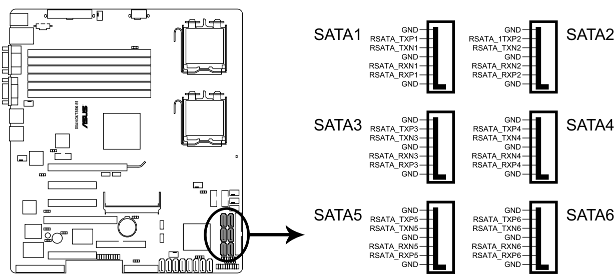
> Pin 5 on the connector is removed to prevent incorrect cable connection when using a FDD cable with a covered Pin 5.



DSAN-DX/TS500-E5
Floppy disk drive connector

2. Serial ATA connectors [black] (7-pin SATA1-6)

These connectors, controlled by southbridge ICH9R, are for the Serial ATA signal cables for Serial ATA hard disk drives.

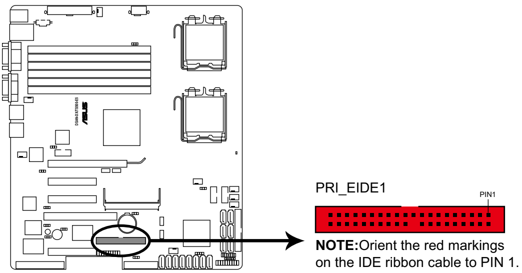


DSAN-DX/TS500-E5
SATA connectors

3. IDE connector (40-1 pin PRI_EIDE1)

This connector is for an Ultra DMA 100/66 signal cable. The Ultra DMA 100/66 signal cable has three connectors: a blue connector for the primary IDE connector on the motherboard, a black connector for an Ultra DMA 100/66 IDE slave device (optical drive/hard disk drive), and a gray connector for an Ultra DMA 100/66 IDE master device (hard disk drive). If you install two hard disk drives, you must configure the second drive as a slave device by setting its jumper accordingly. Refer to the hard disk documentation for the jumper settings.

- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra DMA 100/66 IDE devices.
- The onboard IDE connector is designed for ODD only (PATA).

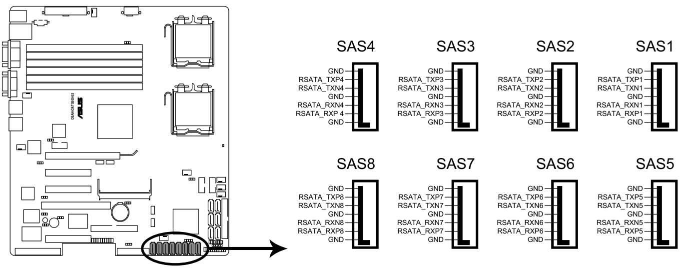


DSAN-DX/TS500-E5 IDE connector

4. SAS connectors [red] (7-pin SAS1-4), [blue] (7-pin SAS5-8)

This motherboard comes with eight (8) Serial Attached SCSI (SAS) connectors, the next-generation storage technology that supports both Series SCSI and Serial ATA (SATA). Each connector supports one device.

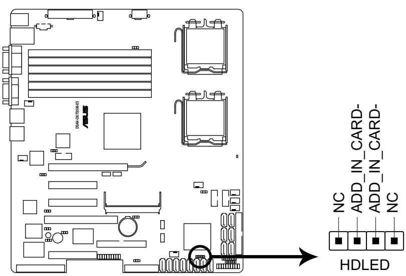
- These connectors function only when you install a PIKE RAID card.
- Connect the SAS hard disk drives to SAS connectors 1–4 when installing a 4-port PIKE RAID card.



DSAN-DX/TS500-E5
SAS connectors

5. Hard disk activity LED connector (4-pin HDLED1)

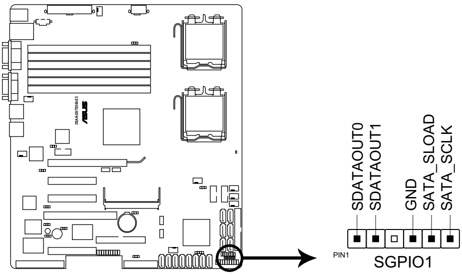
This connector is used to connect to a hard disk drive active LED connector on the SCSI or RAID card.



DSAN-DX/TS500-E5
Storage card activity LED connector

6. **Serial General Purpose Input/Output connector (6-1 pin SGPIO1)**

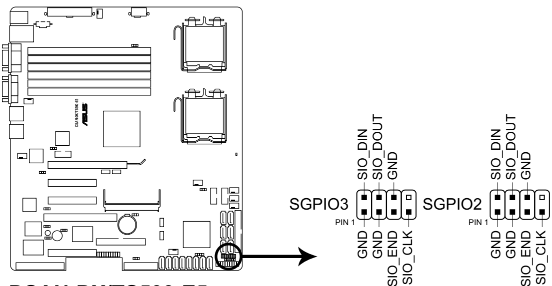
This connector is used for the SGPIO peripherals for the LSI MegaRAID SATA LED.



DSAN-DX/TS500-E5 SGPIO connector

7. **Serial General Purpose Input/Output connectors (6-1 pin SGPIO2/3)**

These connector is used for the SAS chip SIO interface that controls the LED pattern generation, device information and general purpose data.

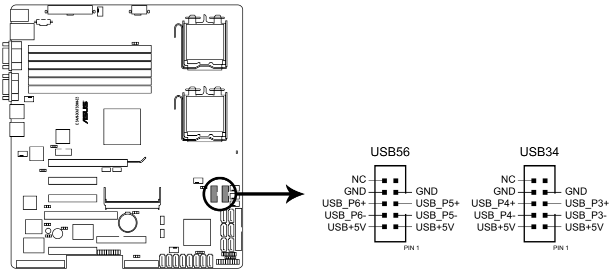


DSAN-DX/TS500-E5
SGPIO2/3 connectors

These connectors functions only when you install a PIKE SAS RAID card.

8. USB connectors (10-1 pin USB34, USB56)

These connectors is for USB 2.0 ports. Connect the USB module cable to the connectors, then install the module to a slot opening at the back of the system chassis. The USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.



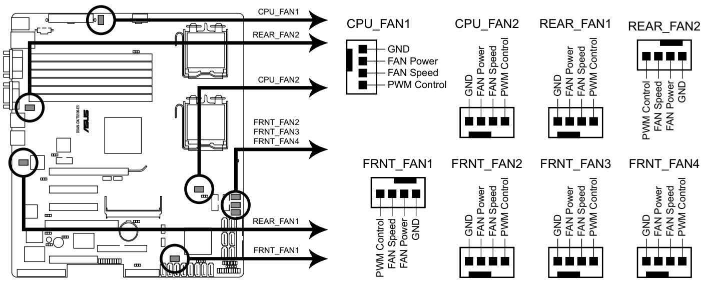
DSAN-DX/TS500-E5
USB 2.0 connectors

The USB port module is purchased separately.

9. CPU and system fan connectors (4-pin CPU_FAN1/2, REAR_FAN1/2, FRNT_FAN1/2/3/4)

The fan connectors support cooling fans of 350 mA–740 mA (8.88 W max.) or a total of 3.15 A–6.66 A (53.28 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.

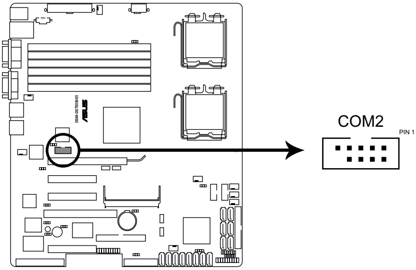
DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors!



DSAN-DX/TS500-E5
FAN connectors

10. Serial port connector (10-1 pin COM2)

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.

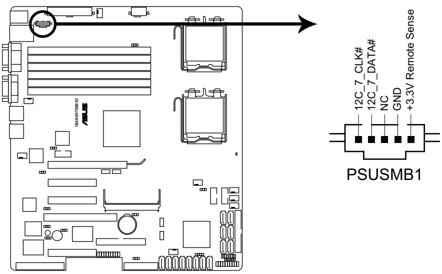


DSAN-DX/TS500-E5
Serial port connectors

The serial port module is purchased separately.

11. Power supply SMBus connector (5-pin PSUSMB1)

This connector is for the power supply SMB cable, if your power supply supports the SMBus function.

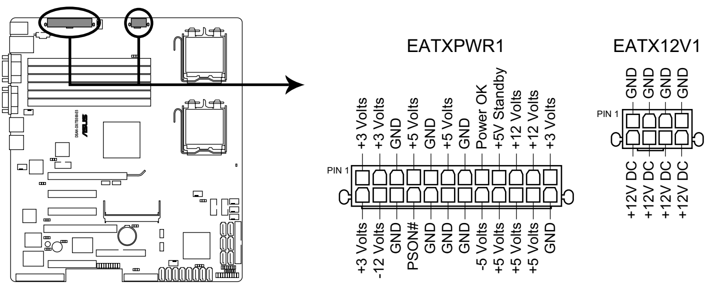


DSAN-DX/TS500-E5
Power supply SMBus connector

12. SSI power connectors (24-pin ATXPWR1, 8-pin ATX12V1)

These connectors are for SSI power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

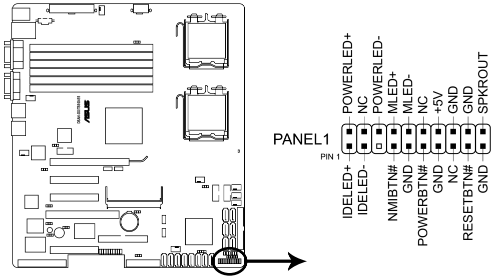
- For a fully configured system, we recommend that you use an SSI 12 V-compliant power supply unit (PSU) for LGA771-socket Intel® Xeon Dual Core processors (Bensley platform).
- DO NOT forget to connect the 24+8-pin power plugs; otherwise, the system will not boot up.
- Use of a PSU with a higher power output is recommended when configuring a system with more power consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- You must install a PSU with a higher power rating if you intend to install additional devices.



DSAN-DX/TS500-E5 ATX power connectors

13. **System panel connector [white] (20-pin PANEL1)**

This connector supports several chassis-mounted functions.

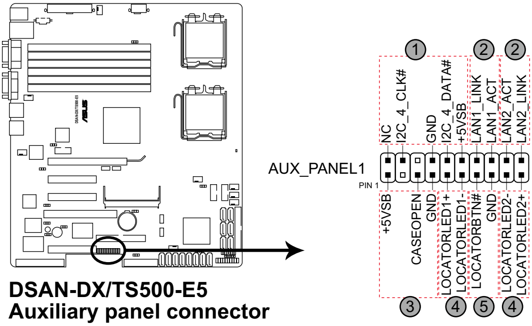


DSAN-DX/TS500-E5
System panel connector

1. **System power LED (3-pin PLED)**
   This 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.
2. **Message LED (2-pin MLED)**
   This 2-pin connector is for the message LED cable that connects to the front message LED. The message LED is controlled by Hardware monitor to indicate an abnormal event occurance.
3. **System warning speaker (4-pin SPEAKER)**
   This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.
4. **Hard disk drive activity LED (2-pin IDE_LED)**
   This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.
5. **ATX power button/soft-off button (2-pin PWRSW)**
   This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.
6. **Reset button (2-pin RESET)**
   This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

14. **Auxiliary panel connector [black] (20-pin AUX_PANEL1)**

This connector is for additional front panel features including front panel SMB, locator LED and switch, chassis intrusion, and LAN LEDs.



DSAN-DX/TS500-E5
Auxiliary panel connector

1. **Front panel SMB (6-1 pin FPSMB)**
   These leads connect the front panel SMBus cable.
2. **LAN activity LED (2-pin LAN1_LED, LAN2_LED)**
   These leads are for Gigabit LAN activity LEDs on the front panel.
3. **Chassis intrusion (4-1 pin CHASSIS)**
   These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to these leads to record a chassis intrusion event. The default setting is short CASEOPEN and GND pin by jumper cap to disable the function.
4. **Locator LED (2-pin LOCATORLED1 and 2-pin LOCATORLED2)**
   These leads are for the locator LED1 and LED2 on the front panel. Connect the Locator LED cables to these 2-pin connector. The LEDs will light up when the Locator button is pressed.
5. **Locator Button/Swich (2-pin LOCATORBTN)**
   These leads are for the locator button on the front panel. This button queries the state of the system locator.

Chapter 5

This chapter tells how to change the system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.



BIOS setup

5.1 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup:

1. **AFUDOS utility** (Updates the BIOS in DOS mode using a bootable floppy disk.)
2. **ASUS CrashFree BIOS 3** (To recover the BIOS using a bootable floppy disk when the BIOS file fails or gets corrupted.)

Refer to the corresponding sections for details on these utilities.

> Save a copy of the original motherboard BIOS file to a bootable floppy disk in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the ASUS Update or AFUDOS utilities.

5.1.1 Creating a bootable floppy disk

1. Do either one of the following to create a bootable floppy disk.

   DOS environment

   a. Insert a 1.44MB floppy disk into the drive.

   b. At the DOS prompt, type `format A:/S` then press <Enter>.

   Windows® environment

   a. Insert a 1.44 MB floppy disk to the floppy disk drive.

   b. Click **Start** from the Windows® desktop, then select **My Computer**.

   c. Select the **3 ½ Floppy Drive** icon.

   d. Right click **File** from the menu, then select **Format**. **A Format 3½ Floppy Disk** window appears.

   e. Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.

5.1.2 AFUDOS utility

The AFUDOS utility allows you to update the BIOS file in DOS environment using a bootable floppy disk with the updated BIOS file. This utility also allows you to copy the current BIOS file that you can use as backup when the BIOS fails or gets corrupted during the updating process.

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:

- Make sure that the floppy disk is not write-protected and has at least 1024 KB free space to save the file.
- The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

1. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.
2. Boot the system in DOS mode, then at the prompt type:

   afudos /o[filename]

   where the [filename] is any user-assigned filename not more than eight alphanumeric characters for the main filename and three alphanumeric characters for the extension name.

```
A:\>afudos /oOLDBIOS1.rom
```

Main filename **Extension name**

3. Press <Enter>. The utility copies the current BIOS file to the floppy disk.

```
A:\>afudos /oOLDBIOS1.rom
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.
   Reading flash ..... done
   Write to file...... ok
A:\>
```

The utility returns to the DOS prompt after copying the current BIOS file.

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

1. Visit the ASUS website (www.asus.com) and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable floppy disk.

Write the BIOS filename on a piece of paper. You need to type the exact BIOS filename at the DOS prompt.

2. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.
3. Boot the system in DOS mode, then at the prompt, type:

   afudos /i[filename]

   where [filename] is the latest or the original BIOS file on the bootable floppy disk, then press <Enter>.

```
A:\>afudos /iTS500-E5.ROM
```

The utility verifies the file, then starts updating the BIOS file.

```
A:\>afudos /iTS500-E5.ROM
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

   WARNING!! Do not turn off power during flash BIOS
   Reading file ....... done
   Reading flash ...... done

   Advance Check ......
   Erasing flash ...... done
   Writing flash ...... 0x0008CC00 (9%)
```

DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

5. The utility returns to the DOS prompt after the BIOS update process is completed. Reboot the system from the hard disk drive.

```
A:\>afudos /iTS500-E5.ROM
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

   WARNING!! Do not turn off power during flash BIOS
   Reading file ....... done
   Reading flash ...... done

   Advance Check ......
   Erasing flash ...... done
   Writing flash ...... done
   Verifying flash .... done

   Please restart your computer

A:\>
```

Updating the BIOS file using a USB flash drive

If you have not purchased a USB floppy disk drive, you may update the BIOS file using a USB flash drive. Format the USB flash drive to FAT16 or 32 system file before updating the BIOS.

To format the USB flash drive to a FAT32/16 system file:

1. Insert the USB flash drive to an available USB port.
2. From the Windows desktop, click **Start**, then select **My Computer**.
3. Right-click the USB flash drive icon, then select **Format** from the menu.
4. From the **File system** field, select **FAT32** or **FAT16**, then click the **Start** button.

To update the BIOS file:

1. Copy the original or the latest BIOS file and the AFUDOS utility (afudos.exe) to the USB flash drive.
2. Insert the USB flash drive to an available USB port, then place the motherboard support CD to the optical drive.
3. Boot the system from the support CD, then select the **FreeDOS command prompt**.
4. At the DOS prompt, replace the prompt with the USB flash disk drive letter, then type: **`afudos /i[filename].`**
5. Follow the instructions in the previous section to update the BIOS file.

5.1.3 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using a floppy disk or a USB flash drive that contains the updated BIOS file.

Prepare a floppy disk or a USB flash drive containing the updated motherboard BIOS before using this utility.

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

1. Turn on the system.
2. Insert the floppy disk with the original or updated BIOS file to the floppy disk drive.
3. The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1. Remove any floppy disk from the floppy disk drive and turn the system.
2. Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.
3. The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.

DO NOT shut down or reset the system while recovering the BIOS! Doing so would cause system boot failure!

The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website (www.asus.com) to download the latest BIOS file.

5.2 BIOS setup program

This motherboard supports a programmable Low-Pin Count (LPC) chip that you can update using the provided utility described in section **5.1 Managing and updating your BIOS**.

Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to “Run Setup.” This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the LPC chip.

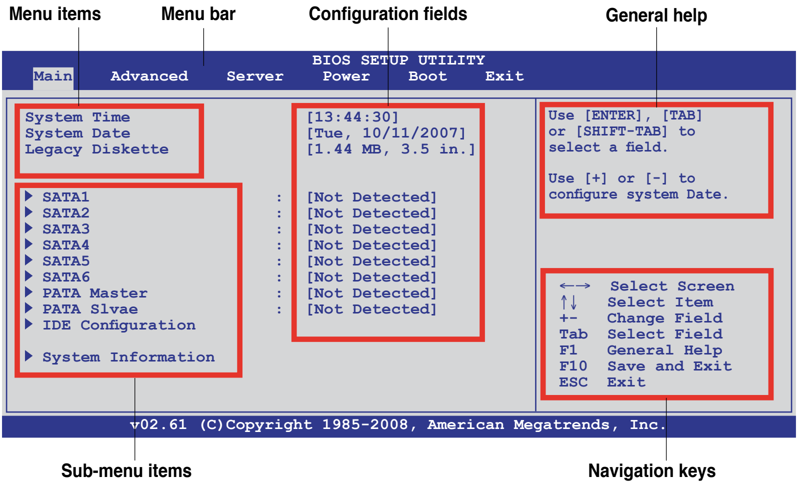
The LPC chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Default Settings** item under the Exit Menu. See section **5.8 Exit Menu**.
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

5.2.1 BIOS menu screen



5.2.2 Menu bar

The menu bar on top of the screen has the following main items:

Main	For changing the basic system configuration
Advanced	For changing the advanced system settings
Server	For changing the advanced server settings
Power	For changing the advanced power management (APM) configuration
Boot	For changing the system boot configuration
Exit	For selecting the exit options and loading default settings

To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

5.2.3 Navigation keys

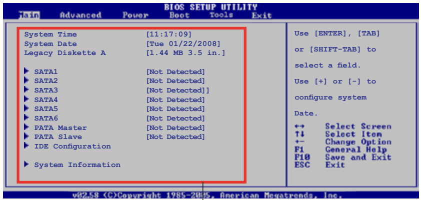
At the bottom right corner of a menu screen are the navigation keys for that particular menu. Use the navigation keys to select items in the menu and change the settings.

Some of the navigation keys differ from one screen to another.

5.2.4 Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting Main shows the Main menu items.

The other items (Advanced, Power, Boot, and Exit) on the menu bar have their respective menu items.



Main menu items

5.2.5 Sub-menu items

A solid triangle before each item on any menu screen means that the item has a sub-menu. To display the sub-menu, select the item and press <Enter>.

5.2.6 Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

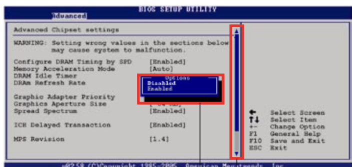
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to **5.2.7 Pop-up window**.

5.2.7 Pop-up window

Select a menu item then press <Enter> to display a pop-up window with the configuration options for that item.

5.2.8 Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> /<Page Down> keys to display the other items on the screen.



Pop-up window

Scroll bar

5.2.9 General help

At the top right corner of the menu screen is a brief description of the selected item.

5.3 Main menu

When you enter the BIOS Setup program, the Main menu screen appears, giving you an overview of the basic system information.

Refer to section **5.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.

```
                                  BIOS SETUP UTILITY
   Main     Advanced    Server    Power    Boot    Exit

 System Time                  [13:44:30]          Use [ENTER], [TAB]
 System Date                  [Tue, 10/11/2007]   or [SHIFT-TAB] to
 Legacy Diskette A            [Disabled]          select a field.

                                                  Use [+] or [-] to
 ▶ SATA1                   :  [Not Detected]      configure system Date.
 ▶ SATA2                   :  [Not Detected]
 ▶ SATA3                   :  [Not Detected]
 ▶ SATA4                   :  [Not Detected]
 ▶ SATA5                   :  [Not Detected]
 ▶ SATA6                   :  [Not Detected]       ←→   Select Screen
 ▶ PATA Master             :  [Not Detected]       ↑↓   Select Item
 ▶ PATA Slvae              :  [Not Detected]       +-   Change Field
 ▶ IDE Configuration                               Tab  Select Field
                                                   F1   General Help
 ▶ System Information                              F10  Save and Exit
                                                   ESC  Exit

            v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

5.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

5.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

5.3.3 Legacy Diskette A [Disabled]

Sets the type of floppy drive installed.
Configuration options: [Disabled] [360 KB, 5.25 in.] [1.2 MB, 5.25 in.] [720 KB, 3.5 in.] [1.44 MB, 3.5 in] [2.88 MB, 3.5 in]

5.3.4 SATA1–6; PATA Master/Slave

The BIOS automatically detects the connected IDE devices. There is a separate sub-menu for each IDE device. Select a device item, then press <Enter> to display the IDE device information.

The PATA device is for ODD (optical disk drive) only.

```
                         BIOS SETUP UTILITY
 Main

 Primary IDE Master                              Select the type
                                                 of device connected
 Device     :Hard Disk                           to the system.
 Vendor     :xxxxxxxxx
 Size       :xx.xGB
 LBA Mode   :Supported
 Block Mode:16Sectors
 PIO Mode   :4
 Async DMA  :MultiWord DMA-2
 Ultra DMA  :Ultra DMA-6
 S.M.A.R.T.:Supported

 Type                            [Auto]          ←→    Select Screen
 LBA/Large Mode                  [Auto]          ↑↓    Select Item
 Block(Multi-Sector Transfer)M   [Auto]          +-    Change Option
 PIO Mode                        [Auto]          F1    General Help
 DMA Mode                        [Auto]          F10   Save and Exit
 SMART Monitoring                [Auto]          ESC   Exit
 32Bit Data Transfer             [Enabled]

       v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

The BIOS automatically detects the values opposite the dimmed items (Device, Vendor, Size, LBA Mode, Block Mode, PIO Mode, Async DMA, Ultra DMA, and S.M.A.R.T. monitoring). These values are not user-configurable. These items show N/A if no IDE device is installed in the system.

Type [Auto]

Selects the type of IDE drive. Setting to [Auto] allows automatic selection of the appropriate IDE device type. Select [CDROM] if you are specifically configuring a CD-ROM drive. Select [ARMD] (ATAPI Removable Media Device) if your device is either a ZIP, LS-120, or MO drive.
Configuration options: [Not Installed] [Auto] [CD/DVD] [ARMD]

LBA/Large Mode [Auto]

Enables or disables the LBA mode. Setting to [Auto] enables the LBA mode if the device supports this mode, and if the device was not previously formatted with LBA mode disabled. Configuration options: [Disabled] [Auto]

Block (Multi-Sector Transfer) M [Auto]

Enables or disables data multi-sectors transfers. When set to [Auto], the data transfer from and to the device occurs multiple sectors at a time if the device supports multi-sector transfer feature. When set to [Disabled], the data transfer from and to the device occurs one sector at a time.
Configuration options: [Disabled] [Auto]

PIO Mode [Auto]

Allows you to select the data transfer mode.
Configuration options: [Auto] [0] [1] [2] [3] [4]

DMA Mode [Auto]

Sets the DMA mode.
Configuration options: [Auto] [SWDMA0] [SWDMA1] [SWDMA2] [MWDMA0] [MWDMA1] [MWDMA2] [UDMA0] [UDMA1] [UDMA2] [UDMA3] [UDMA4] [UDMA5] [UDMA6]

SMART Monitoring [Auto]

Sets the Smart Monitoring, Analysis, and Reporting Technology.
Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

Enables or disables 32-bit data transfer.
Configuration options: [Disabled] [Enabled]

5.3.5 IDE Configuration

The items in this menu allow you to set or change the configurations for the IDE devices installed in the system. Select an item then press <Enter> if you wish to configure the item.

```
                          BIOS SETUP UTILITY
 Main
 IDE Configuration                                    Options
 ____________________________________________
 SATA#1 Configuration          [Enhanced]             Disabled
   Configure SATA#1 as         [IDE]                  Compatible
 SATA#2 Configuration          [Enhanced]             Enhanced

 Hard Disk Write Protect       [Disabled]

                                                      ←→   Select Screen
                                                      ↑↓   Select Item
                                                      +-   Change Field
                                                      F1   General Help
                                                      F10  Save and Exit
                                                      ESC  Exit
          v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

SATA#1–2 Configuration [Enhanced]

Configuration options: [Disabled] [Compatible] [Enhanced]

Configure SATA#1 as [IDE]

Sets the configuration for the Serial ATA connectors supported by the Southbridge chip. Configuration options: [IDE] [RAID] [AHCI]

If you want to create a RAID 0, RAID 1, RAID 5, RAID 10, or the Intel® Matrix Storage Technology configuration from the Serial ATA hard disk drives, set this item to [RAID].

If you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices, keep the default setting [IDE].

If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), set this item to [AHCI]. The [AHCI] option allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.

Hard Disk Write Protect [Disabled]

Disables or enables device write protection. This will be effective only if device is accessed through BIOS. Configuration option: [Disabled] [Enabled]

5.3.6 System Information

This menu gives you an overview of the general system specifications. The BIOS automatically detects the items in this menu.

```
                              BIOS SETUP UTILITY
   Main
 System Information
 ______________________________________________

 AMIBIOS

 Version    : 0204
 Build Date: 05/13/08

 Processor

 Speed      : 1866MHz
 Count      : 1

 System Memory                                      ←→    Select Screen
                                                    ↑↓    Select Item
 Usable Size    : 2048MB                            F1    General Help
                                                    F10   Save and Exit
                                                    ESC   Exit

          v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

AMIBIOS

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

Displays the auto-detected system memory.

5.4 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.

Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

```
                              BIOS SETUP UTILITY
  Main     Advanced     Server     Power     Boot     Exit

  ▶  USB Configuration                          Configure the USB
                                                support.
  ▶  CPU Configuration
  ▶  Chipset
  ▶  Onboard Devices Configuration
  ▶  PCIPnP



                                                ←→    Select Screen
                                                ↑↓    Select Item
                                                Enter Go to Sub Screen
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit

              v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

5.4.1 USB Configuration

The items in this menu allows you to change the USB-related features. Select an item then press <Enter> to display the configuration options.

```
                              BIOS SETUP UTILITY
           Advanced

  USB Configuration                                   Options
  Module Version - 2.24.3-13.4
                                                Disabled
  USB Devices Enabled:                          Enabled

              None

  USB Functions                [Enabled]
  Legacy USB Support           [Enabled]
  USB 2.0 Controller Mode      [HiSpeed]
  BIOS EHCI Hand-Off           [Enabled]
                                                ←→    Select Screen
                                                ↑↓    Select Item
                                                +-    Change Option
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit

              v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

The **USB Devices Enabled** item shows the auto-detected values. If no USB device is detected, the item shows None.

USB Functions [Enabled]

Allows you to enable the USB host controller.
Configuration options: [Disabled] [Enabled]

The following item appears only when you set **USB Function** to [Enabled].

Legacy USB Support [Enabled]

Allows you to enable or disable support for legacy USB devices. Setting to [Auto] allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled. Configuration options: [Disabled] [Enabled] [Auto]

The following item appears only when you set **USB Function** to [Enabled].

USB 2.0 Controller Mode [HiSpeed]

Allows you to set the USB 2.0 controller to HiSpeed (480Mbps) or FullSpeed (12Mbps). Configuration options: [FullSpeed] [HiSpeed]

BIOS EHCI Hand-Off [Enabled]

Enables or disables the BIOS EHCI hand-off support.
Configuration options: [Disabled] [Enabled]

5.4.2 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects. Some items may not appear if you CPU does not support the related functions.

```
                         BIOS SETUP UTILITY
          Advanced
 Configure advanced CPU settings              | Sets the ratio between
 Module Version:3F.06                         | CPU Core Clock and the
 Manufacturer:Intel                           | FSB Frequency.
 Brand String:Intel(R) Xeon(R) CPU     5150   | Note:If an invalid
 Frequency   :2.66GHz                         | ratio is set in CMOS
 FSB Speed   :1333 MHz                        | then actual and
 Cache L1    :64 KB                           | setpoint values may
 Cache L2    :4096 KB                         | differ.
 Ratio Status:Unlocked (Min:06, Max:08)       |
 Ratio Actual Value: 8                        |
                                              |
   Ratio CMOS Setting                [7]      | ←→   Select Screen
 C1E Support                    [Enabled]     | ↑↓   Select Item
 Hardware Prefetcher            [Enabled]     | +-   Change Option
 Adjacent Cache Line Prefetch   [Enabled]     | F1   General Help
 Max CPUID Value Limit          [Disabled]    | F10  Save and Exit
 Intel(R) Virtualization Tech   [Enabled]     | ESC  Exit
 Execute-Disable Bit Capability [Enabled]     |
 Core Multi-Processing          [Enabled]     |
        v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Scroll down for more items.

```
 Intel(R) SpeedStep(tm) tech.     [Enabled]   |
        v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Ratio CMOS Setting [7]

Whether this item is configurable depends on your CPU type. The valid value ranges differently according to your CPU type. If this item is configurable, enter the value using the numeric keypad. This item is available only when Intel SpeedStep technology is disabled.

C1E Support [Enabled]

Allows you to enable or disable C1E support.
Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

Enable this item to use the Hardware Prefetcher Disable Feature.
Configuration options: [Disabled] [Enabled]

*Adjacent Cache Line Prefetch [Enabled]

Enable this item to use the Adjacent Cache Line Prefetch Disable Feature.
Configuration options: [Disabled] [Enabled]

Max CPUID Value Limit [Disabled]

Setting this item to [Enabled] allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.
Configuration options: [Disabled] [Enabled]

Intel(R) Virtualization Tech [Enabled]

The Vanderpool Virtualization Technology allows a hardware platform to run multiple operating systems separately, enabling one system to virtually function as several systems. Configuration options: [Disabled] [Enabled]

Execute-Disable Bit Capability [Enabled]

Allows you to enable or disable the No-Execution Page Protection Technology. Setting this item to [Disabled] forces the XD feature flag to always return to zero (0). Configuration options: [Disabled] [Enabled]

Core Multi-Processing [Enabled]

Configuration options: [Disabled] [Enabled]

Intel(R) SpeedStep(tm) tech. [Enabled]

Allows you to enable or disable the Intel SpeedStep Technology. Refer to the Appendix for more information on the Intel SpeedStep Technology.
Configuration options: [Disabled] [Enabled]

Items above with * mark are for technical personnel to debug only.

5.4.3 Chipset

The Chipset configuration menu allows you to change advanced chipset settings. Select an item then press <Enter> to display the sub-menu.

```
                         BIOS SETUP UTILITY
        Advanced
 Advanced Chipset Settings                    Configure North Bridge
                                              features.
 WARNING: Setting wrong values in below sections
          may cause system to malfunction.

 ▶  North Bridge Configuration

                                              ←→    Select Screen
                                              ↑↓    Select Item
                                              Enter Go to Sub Screen
                                              F1    General Help
                                              F10   Save and Exit
                                              ESC   Exit

        v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

North Bridge Configuration

The North Bridge Configuration menu allows you to change the Northbridge settings.

```
                         BIOS SETUP UTILITY
        Advanced
 Crystal Beach / DMA           [Disabled]     Crystal Beach / DMA
                                              configuration
 MCH Channel Mode              [Channel Interleave]
 Patrol Scrubbing              [Enabled]
 Demand Scrubbing              [Enabled]
 Channel Dependent Sparing     [Disabled]
 Channel 0                     [Enabled]
 Channel Specific Sparing      [Disabled]
 Rank Interleaving             [4:1]
 Channel 1                     [Enabled]
 Channel Specific Sparing      [Disabled]
 Rank Interleaving             [4:1]

 Read Completion Coalescing    [Auto]
                                              ←→    Select Screen
                                              ↑↓    Select Item
                                              +-    Change Option
                                              F1    General Help
                                              F10   Save and Exit
                                              ESC   Exit

        v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Crystal Beach / DMA [Disabled]

Allows you to do the Crystal Beach/DMA configuration.
Configuration options: [Disabled] [Enabled]

MCH Channel Mode [Channel Interleave]

Allows you to select the MCH channel mode.
Configuration options: [Channel Sequencing] [Channel Interleave] [Single Channel 0]

Patrol Scrubbing [Enabled]

Enables or disables the Patrol Scrubbing.
Configuration options: [Disabled] [Enabled]

Demand Scrubbing [Disabled]

Enables or disables the Demand Scrubbing.
Configuration options: [Disabled] [Enabled]

Channel Dependent Sparing [Disabled]

Allows you to enable or disabled the channel-dependent DIMM sparing feature.
Configuration options: [Disabled] [Enabled]

Channel 0 [Enabled]

Allows you to enable or disable the Channel 0. If you set this item to [Disabled], the following three items will be grayed out.
Configuration options: [Disabled] [Enabled]

Channel Specific Sparing [Disabled]

Allows you to enable or disable the DIMM sparing feature.
Configuration options: [Disabled] [Enabled]

Rank Interleaving [4:1]

Allows you to select the Channel 0 Rank Interleave.
Configuration options: [1:1] [2:1] [4:1]

Channel 1 [Enabled]

Allows you to enable or disable the Channel 1. If you set this item to [Disabled], **Channel 0** and the following two items will be grayed out.
Configuration options: [Disabled] [Enabled]

Channel Specific Sparing [Disabled]

Allows you to enable or disable the DIMM sparing feature.
Configuration options: [Disabled] [Enabled]

Rank Interleaving [4:1]

Allows you to select the Channel 1 Rank Interleave.
Configuration options: [1:1] [2:1] [4:1]

Read Completion Coalescing [Auto]

Configuration options: [Disabled] [Enabled] [Auto]

5.4.4 Onboard Device Configuration

```
                         BIOS SETUP UTILITY
        Advanced
 Configure Win627EHF Super IO Chipset          | Allows BIOS to Enable
 --------------------------------------------  | or Disable Floppy
                                               | Controller.
 Serial Port1 Address        [3F8/IRQ4]        |
 Serial Port2 Address        [2F8/IRQ3]        |
   Serial Port2 Mode         [Normal]          |
                                               |
  OnBoard LAN1 Boot ROM      [Enabled]         |
  OnBoard LAN2 Boot ROM      [Enabled]         |
                                               |
                                               |  ←→   Select Screen
                                               |  ↑↓   Select Item
                                               |  +-   Change Option
                                               |  F1   General Help
                                               |  F10  Save and Exit
                                               |  ESC  Exit
        v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.
Configuration options: [Disabled] [3F8/IRQ4] [3E8/IRQ4] [2E8/IRQ3]

Serial Port2 Address [2F8/IRQ3]

Allows you to select the Serial Port2 base address.
Configuration options: [Disabled] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

Serial Port2 Mode [Normal]

Allows you to select the mode for Serial Port2.
Configuration options: [Normal] [IrDA] [ASK IR]

IR I/O Pin Select [SINB/SOUTB]

This item appears only when you set the **Serial Port2 Mode** item to [IrDa] or [ASK IR] and allows you to select the receiver or transmit pin for Serial Port2.
Configuration options: [SINB/SOUTB] [IRRX/IRTX]

IR Duplex Mode [Half Duplex]

This item appears only when you set the **Serial Port2 Mode** item to [IrDa] or [ASK IR] and allows you to select Full or Half Duplex for Serial Port2.
Configuration options: [Full Duplex] [Half Duplex]

Onboard LAN1/2 Boot ROM [Enabled]

Allows you to do the LAN Boot ROM configuration.
Configuration options: [Disabled] [Enabled]

5.4.5 PCIPnP

The PCIPnP menu items allow you to change the advanced settings for PCI/PnP devices. The menu includes setting IRQ and DMA channel resources for either PCI/PnP or legacy ISA devices, and setting the memory size block for legacy ISA devices.

> Take caution when changing the settings of the PCI/PnP Configuration menu items. Incorrect field values can cause the system to malfunction.

```
                         BIOS SETUP UTILITY
        Advanced
 Advanced PCI/PnP Settings                         NO: lets the BIOS
                                                   configure all the
 WARNING: Setting wrong values in below sections   devices in the
          may cause system to malfunction.         system. YES: lets
                                                   the operating system
 Plug & Play O/S               [No]                configure Plug and
 PCI Latency Timer             [64]                Play (PnP) devices not
 Allocate IRQ to PCI VGA       [Yes]               required for boot if
 Palette Snooping              [Disabled]          your system has a Plug
                                                   and Play operating
                                                   system.

                                                    ←→   Select Screen
                                                    ↑↓   Select Item
                                                    +-   Change Option
                                                    F1   General Help
                                                    F10  Save and Exit
                                                    ESC  Exit
           v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Plug And Play O/S [No]

When set to [No], BIOS configures all the devices in the system. When set to [Yes] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot.
Configuration options: [No] [Yes]

PCI Latency Timer [64]

Allows you to select the value in units of PCI clocks for the PCI device latency timer register. Configuration options: [32] [64] [96] [128] [160] [192] [224] [248]

Allocate IRQ to PCI VGA [Yes]

When set to [Yes], BIOS assigns an IRQ to PCI VGA card if the card requests for an IRQ. When set to [No], BIOS does not assign an IRQ to the PCI VGA card even if requested. Configuration options: [Yes] [No]

Palette Snooping [Disabled]

When set to [Enabled], the pallete snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

5.5 Server menu

```
                              BIOS SETUP UTILITY
 Main    Advanced    Server    Power     Boot     Exit

 ASF Support                         [Enabled]          Configure Remote
 ▶  Remote Access Configuration                         Access.

                                                        ←→   Select Screen
                                                        ↑↓   Select Item
                                                        +-   Change Option
                                                        F1   General Help
                                                        F10  Save and Exit
                                                        ESC  Exit

              v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

5.5.1 ASF Support [Enabled]

Allows you to enable or disable the ASF support.
Configuration options: [Disabled] [Enabled]

5.5.2 Remote Access Configuration

The items in this menu allows you to configure the Remote Access features. Select an item then press <Enter> to display the configuration options.

```
                              BIOS SETUP UTILITY
                        Server

 Configure Remote Access type and parameters            Select Remote Access
 ---------------------------------------------------    type.

 Remote Access                      [Enabled]

 Serial port number                 [COM2]
      Base Address, IRQ             [2F8h, 3]
 Serial Port Mode                   [57600 8,n,1]
 Flow Control                       [Hardware]
 Redirection After BIOS POST        [Disabled]
 Terminal Type                      [VT-UTF8]           ←→   Select Screen
 Sredir Memory Display Delay        [No Delay]          ↑↓   Select Item
                                                        +-   Change Option
                                                        F1   General Help
                                                        F10  Save and Exit
                                                        ESC  Exit

              v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Remote Access [Enabled]

Enables or disables the remote access feature.
Configuration options: [Disabled] [Enabled]

The following items appear only when **Remote Access** is set to [Enabled].

Serial port number [COM2]

Selects the serial port for console redirection.
Configuration options: [COM1] [COM2]

Base Address. IRQ [2F8h, 3]
This item is not user-configurable and changes with the configuration of **Serial port number**.

Serial port Mode [57600 8,n,1]

Sets the Serial port mode.
Configuration options: [115200 8,n,1] [57600 8,n,1] [38400 8,n,1] [19200 8,n,1]

Flow Control [Hardware]

Allows you to select the flow control for console redirection.
Configuration options: [None] [Hardware] [Software]

Redirection After BIOS POST [Disabled]

Sets the redirection mode after the BIOS Power-On Self-Test (POST). Some operating system may not work when set to [Always].
Configuration options: [Disabled] [Boot Loader] [Always]

Terminal Type [VT-UTF8]

Allows you to select the target terminal type.
Configuration options: [ANSI] [VT100] [VT-UTF8]

VT-UTF8 Combo Key Support [Enabled]

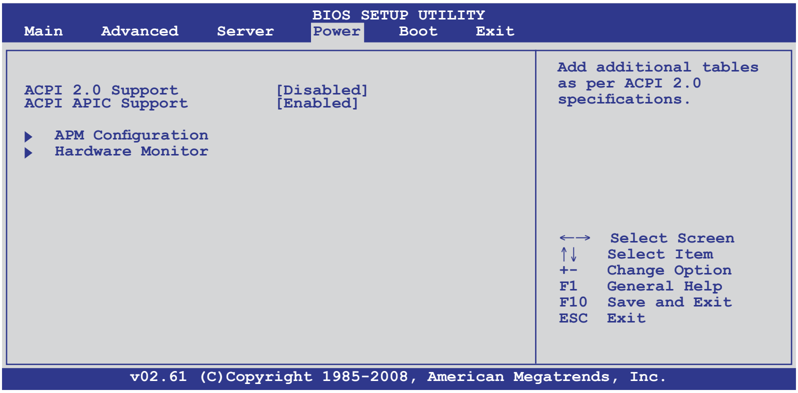
Enables or disables the VT-UTF8 combo key support for ANSI or VT100 terminals.
Configuration options: [Disabled] [Enabled]

Sredir Memory Display Delay [No Delay]

Sets the delay seconds to display memory information.
Configuration options: [No Delay] [Delay 1 Sec] [Delay 2 Sec] [Delay 4 Sec]

5.6 Power menu

The Power menu items allow you to change the settings for the Advanced Power Management (APM). Select an item then press <Enter> to display the configuration options.



5.6.1 ACPI 2.0 Support [Disabled]

Specifies the Advanced Configuration and Power Interface (ACPI) version supported. Configuration options: [Disabled] [Enabled]

5.6.2 ACPI APIC Support [Enabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC). When set to Enabled, the ACPI APIC table pointer is included in the RSDT pointer list. Configuration options: [Disabled] [Enabled]

5.6.3 APM Configuration

```
                         BIOS SETUP UTILITY
                         Power
 Restore on AC Power Loss      [Last State]   <Enter> to select
 Power On By External Modems   [Disabled]     whether or not to
 Power On by PME               [Disabled]     restart the system
 Power On By RTC Alarm         [Disabled]     after AC power loss

                                               ←→   Select Screen
                                               ↑↓   Select Item
                                               +-   Change Option
                                               F1   General Help
                                               F10  Save and Exit
                                               ESC  Exit
       v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Restore on AC Power Loss [Last State]

When set to [Power Off], the system goes into off state after an AC power loss. When set to [Power On], the system will reboot after an AC power loss. When set to [Last State], the system goes into either off or on state, whatever the system state was before the AC power loss.
Configuration options: [Power Off] [Power On] [Last State]

Power On By External Modems [Disabled]

This allows either settings of [Enabled] or [Disabled] for powering up the computer when the external modem receives a call while the computer is in Soft-off mode.
Configuration options: [Disabled] [Enabled]

Setting this item to [Enabled] allows the computer to power up even when the **Serial Port1/2 Address** item in the **Onboard Device Configuration** menu is set to [Disabled]. See section **5.4.4 Onboard Device Configuration** for details.

Resume On PME [Disabled]

When set to [Enabled], the system enables the PME to generate a wake event while the computer is in Soft-off mode.
Configuration options: [Disabled] [Enabled]

Resume On RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake-up event.
Configuration options: [Disabled] [Enabled]

5.6.4 Hardware Monitor

```
                         BIOS SETUP UTILITY
                              Power
 Hardware Monitor
 ▶  Hardware Temperature Configuration
 ▶  Hardware Fan Configuration
 ▶  Hardawre Voltage Configuration

                                                  ←→   Select Screen
                                                  ↑↓   Select Item
                                                  Enter Go to Sub Screen
                                                  F1   General Help
                                                  F10  Save and Exit
                                                  ESC  Exit
           v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Hardware Temperature Configuration

The Hardware Temperature Configuration menu provides an overview of the hardware temperature information. The BIOS automatically detects the items in this menu.

CPU1/CPU2 [xxxºC/xxxºF]
System1/2 [xxxºC/xxxºF]
The onboard hardware monitor automatically detects and displays the motherboard and CPU temperatures. The CPU1 Temperature shows N/A if no processor is installed in CPU1 socket.

Hardware Fan Configuration

The Hardware Fan Configuration menu provides an overview of the hardware fan information. The BIOS automatically detects the items in this menu.

CPU FAN1/2; FRN FAN1/2/3/4; REAR FAN1/2 [xxxxRPM] or [N/A]
The onboard hardware monitor automatically detects and displays the CPU, front, and rear fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows N/A.

Hardware Voltage Configuration

The Hardware Voltage Configuration menu provides an overview of the hardware fan information. The BIOS automatically detects the items in this menu.

VCOREA/B, Vtt, VSEN1/2, 3VSEN, 12VSEN, 5VDD, 5VSB, VBAT
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators.

5.7 Boot menu

The Boot menu items allow you to change the system boot options. Select an item then press <Enter> to display the sub-menu.

```
                          BIOS SETUP UTILITY
  Main    Advanced    Server    Power    Boot    Exit

  ▶  Boot Device Priority                    Specifies the Boot
                                             Device Priority
  ▶  Boot Settings Configuration             sequence.
  ▶  Security
                                             A virtual floppy disk
                                             drive (Floppy Drive B:
                                             ) may appear when you
                                             set the CD-ROM drive
                                             as the first boot
                                             device.

                                             ←→     Select Screen
                                             ↑↓     Select Item
                                             Enter  Go to Sub Screen
                                             F1     General Help
                                             F10    Save and Exit
                                             ESC    Exit

          v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

5.7.1 Boot Device Priority

```
                          BIOS SETUP UTILITY
                                 Boot

  Boot Device Priority                       Specifies the Boot
  ________________________________________   Device Priority
                                             sequence.
  1st Boot Device        [1st FLOPPY DRIVE]
  2nd Boot Device        [ATAPI CD-ROM]      A device enclosed
  3rd Boot Device        [Network:MBA v10.0.] in parenthesis has
  4th Boot Device        [Network:MBA v10.0.] been disabled in the
                                             corresponding type
                                             menu.

                                             ←→    Select Screen
                                             ↑↓    Select Item
                                             +-    Change Option
                                             F1    General Help
                                             F10   Save and Exit
                                             ESC   Exit

          v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

1st ~ xxth Boot Device [XXXXXXX]

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Configuration options: [xxxxx Drive] [Disabled]

5.7.2 Boot Settings Configuration

```
                          BIOS SETUP UTILITY
                                                Boot
 Boot Settings Configuration                        Allows BIOS to skip
                                                     certain tests while
 Quick Boot                    [Enabled]             booting. This will
 Full Screen Logo              [Enabled]             decrease the time
 AddOn ROM Display Mode        [Force BIOS]          needed to boot the
 Bootup Num-Lock               [On]                  system.
 PS/2 Mouse Support            [Auto]
 Wait For 'F1' If Error        [Enabled]
 Hit 'DEL' Message Display     [Enabled]
 Interrupt 19 Capture          [Enabled]
                                                     ←→   Select Screen
                                                     ↑↓   Select Item
                                                     +-   Change Option
                                                     F1   General Help
                                                     F10  Save and Exit
                                                     ESC  Exit

          v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Quick Boot [Enabled]

Enabling this item allows the BIOS to skip some power on self tests (POST) while booting to decrease the time needed to boot the system. When set to [Disabled], BIOS performs all the POST items.
Configuration options: [Disabled] [Enabled]

Full Screen Logo [Enabled]

Allows you to enable or disable the full screen logo display feature.
Configuration options: [Disabled] [Enabled]

Set this item to [Enabled] to use the ASUS MyLogo2™ feature.

AddOn ROM Display Mode [Force BIOS]

Allows you to set the display mode for Options ROM.
Configuration options: [Force BIOS] [Keep Current]

Bootup Num-Lock [On]

Allows you to select the power-on state for the NumLock.
Configuration options: [Off] [On]

PS/2 Mouse Support [Auto]

Allows you to enable or disable support for PS/2 mouse.
Configuration options: [Disabled] [Enabled] [Auto]

Wait For 'F1' If Error [Enabled]

When set to [Enabled], the system waits for the <F1> key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]

Hit 'DEL' Message Display [Enabled]

When set to [Enabled], the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Enabled]

When set to [Enabled], this function allows the option ROMs to trap Interrupt 19. Configuration options: [Disabled] [Enabled]

5.7.3 Security

The Security menu items allow you to change the system security settings. Select an item then press <Enter> to display the configuration options.

```
                        BIOS SETUP UTILITY
                              Boot
 Security Settings                              <Enter> to change
                                                password.
 Supervisor Password : Not Installed            <Enter> again to
 User Password       : Not Installed            disable password.

 Change Supervisor Password
 Change User Password

                                                ←→     Select Screen
                                                ↑↓     Select Item
                                                Enter  Change
                                                F1     General Help
                                                F10    Save and Exit
                                                ESC    Exit
        v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Change Supervisor Password

Select this item to set or change the supervisor password. The **Supervisor Password** item on top of the screen shows the default **Not Installed**. After you set a password, this item shows **Installed**.

To set a Supervisor Password:

1. Select the **Change Supervisor Password** item and press <Enter>.
2. From the password box, type a password composed of at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

The message “Password Installed” appears after you successfully set your password.

To change the supervisor password, follow the same steps as in setting a user password.

To clear the supervisor password, select the **Change Supervisor Password** then press <Enter>. The message “Password Uninstalled” appears.

> If you forget your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section **4.2 Jumper** for information on how to erase the RTC RAM.

After you have set a supervisor password, the other items appear to allow you to change other security settings.

```
                    BIOS SETUP UTILITY
                          Boot
 Supervisor Password : Installed             <Enter> to change
 User Password       : Not Installed         password.
                                             <Enter> again to
 Change Supervisor Password                  disable password.
 User Access Level            [Full Access]
 Change User Password
 Password Check               [Setup]
```

User Access Level [Full Access]

This item allows you to select the access restriction to the Setup items. Configuration options: [No Access] [View Only] [Limited] [Full Access]

No Access prevents user access to the Setup utility.

View Only allows access but does not allow change to any field.

Limited allows changes only to selected fields, such as Date and Time.

Full Access allows viewing and changing all the fields in the Setup utility.

Change User Password

Select this item to set or change the user password. The **User Password** item on top of the screen shows the default **Not Installed**. After you set a password, this item shows Installed.

To set a User Password:

1. Select the **Change User Password** item and press <Enter>.
2. On the password box that appears, type a password composed of at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

The message “Password Installed” appears after you set your password successfully.

To change the user password, follow the same steps as in setting a user password.

Password Check [Setup]

When set to [Setup], BIOS checks for user password when accessing the Setup utility. When set to [Always], BIOS checks for user password both when accessing Setup and booting the system. Configuration options: [Setup] [Always]

5.8 Exit menu

The Exit menu items allow you to load the optimal or failsafe default values for the BIOS items, and save or discard your changes to the BIOS items.

```
                              BIOS SETUP UTILITY
  Main     Advanced     Server     Power     Boot     Exit
 ------------------------------------------------------------------------
  Exit Options                                  Exit system setup
  ----------------------------------------      after saving the
  Exit & Save Changes                           changes.
  Exit & Discard Changes
  Discard Changes                               F10 key can be used
                                                for this operation.
  Load Setup Defaults




                                                ←→     Select Screen
                                                ↑↓     Select Item
                                                Enter  Go to Sub Screen
                                                F1     General Help
                                                F10    Save and Exit
                                                ESC    Exit

        v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

Exit & Save Changes

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. An onboard backup battery sustains the CMOS RAM so it stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select **YES** to save changes and exit.

If you attempt to exit the Setup program without saving your changes, the program prompts you with a message asking if you want to save your changes before exiting. Press <Enter> to save the changes while exiting.

Exit & Discard Changes

Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than System Date, System Time, and Password, the BIOS asks for a confirmation before exiting.

Discard Changes

This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select **YES** to discard any changes and load the previously saved values.

Load Setup Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **YES** to load default values. Select **Exit & Save Changes** or make other changes before saving the values to the non-volatile RAM.

Chapter 6

This chapter provides instructions for setting up, creating and configuring RAID sets using the available utilities.



RAID configuration

6.1 Setting up RAID

The motherboard comes with the following RAID solutions:

- LSI Software RAID Configuration Utility embeded in the Intel ICH9R Southbridge supports Serial ATA hard disk drives and RAID0, RAID1, and RAID10 configurations.
- Intel Matrix Storage Manager embeded in the Intel ICH9R Southbridge supports Serial ATA hard disk drives and RAID0, RAID1, RAID10, and RAID5 configuration.

6.1.1 RAID definitions

RAID 0 *(Data striping)* optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 *(Data mirroring)* copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

Intel® Matrix Storage. The Intel® Matrix Storage technology supported by the ICH9R chip allows you to create a RAID 0, RAID 1, RAID 5, and RAID 10* function to improve both system performance and data safety. You can also combine two RAID sets to get higher performance, capacity, or fault tolerance provided by the difference RAID function. For example, RAID 0 and RAID 1 set can be created by using only two identical hard disk drives.

> If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support CD to a floppy disk before you install an operating system to the selected hard disk drive.

6.1.2 Installing hard disk drives

The motherboard supports Serial ATA for RAID set configuration. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for RAID configuration:

1. Install the SATA hard disks into the drive bays following the instructions in the system user guide.
2. Connect a SATA signal cable to the signal connector at the back of each drive and to the SATA connector on the motherboard.
3. Connect a SATA power cable to the power connector on each drive.

6.1.3 Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set from SATA hard disk drives attached to the SATA connectors supported by the Intel® ICH9R Southbridge chip. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main Menu** > **IDE Configuration**, then press <Enter>.
3. Set the **SATA#1 Configuration** item to [Enhanced].
4. Set the **Configure SATA#1 as** item to [RAID].
5. Save your changes, then exit the BIOS Setup.

Refer to Chapter 5 for details on entering and navigating through the BIOS Setup.

6.1.4 RAID configuration utilities

Depending on the RAID connectors that you use, you can create a RAID set using the utilities embedded in each RAID controller. For example, use the **LSI Software RAID Configuration Utility** or the **Intel® Matrix Storage Manager** if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the Intel® ICH9R Southbridge.

Refer to the succeeding sections for details on how to use each RAID configuration utility.

6.2 LSI Software RAID Configuration Utility

The LSI Software RAID Configuration Utility allows you to create RAID 0, RAID 1, or RAID 10 set(s) from SATA hard disk drives connected to the SATA connectors supported by the motherboard Southbridge chip.

To enter the LSI Software RAID Configuration Utility:

1. Turn on the system after installing all the SATA hard disk drives.
2. During POST, the LSI Software RAID Configuration Utility automatically detects the installed SATA hard disk drives and displays any existing RAID set(s). Press <Ctrl> + <M> to enter the utility.

```
LSI MegaRAID Software RAID BIOS Version A.01 08131852R
LSI SATA RAID Found at PCI Bus No: Dev No:1F
Device present at Port 0     HDS722512VLSA80  117800MB
Device present at Port 1     HDS722512VLSA80  117800MB

Press Ctrl-M or Enter to run LSI Software RAID Setup Utility.
```

- The LSI Software RAID Configuration Utitlity auto configures to RAID 1 when the SATA to RAID Mode is enabled.
- The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.
- When you create RAID sets with the LSI Software RAID configuration utility, the boot priority of the SATA optical drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

3. The utility main window appears. Use the arrow keys to select an option from the **Management Menu**, then press <Enter>. Refer to the Management Menu descriptions on the next page.

   At the bottom of the screen is the legend box. The keys on the legend box allow you to navigate through the setup menu options or execute commands. The keys on the legend box vary according to the menu level.

```
LSI Logic Software RAID Configuration Utility Ver A.51 Aug 13, 2007

Management Menu
Configure
Initialize
Objects
Rebuild
Check Consistency

Configure VD(s)

Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```

Menu	Description
Configure	Allows you to create RAID 0, RAID 1 or RAID 10 set using the Easy Configuration or the New Configuration command. This menu also allows you to view, add, or clear RAID configurations or select the boot drive
Initialize	Allows you to initialize the logical drives of a created RAID set
Objects	Allows you to initialize logical drives or change the logical drive parameters
Rebuild	Allows you to rebuild failed drives
Check Consistency	Allows you to check the data consistency of the logical drives of a created RAID set

6.2.1 Creating a RAID 0 or RAID 1 set

The LSI Software RAID Configuration Utility allows you to create a RAID 0 or RAID 1 set using two types of configurations: **Easy** and **New**.

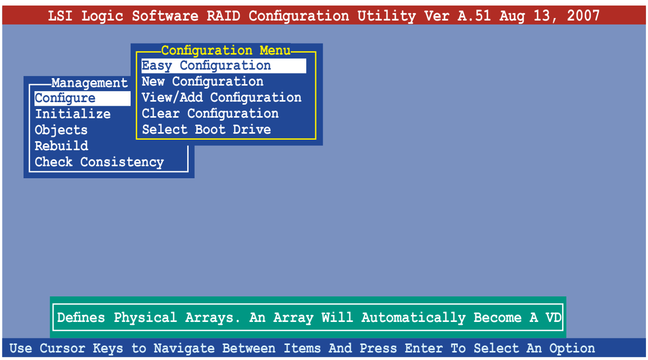
In **Easy Configuration**, the logical drive parameters are set automatically including the size and stripe size (RAID 1 only).

In **New Configuration**, you manually set the logical drive parameters and assign the set size and stripe size (RAID 1 only).

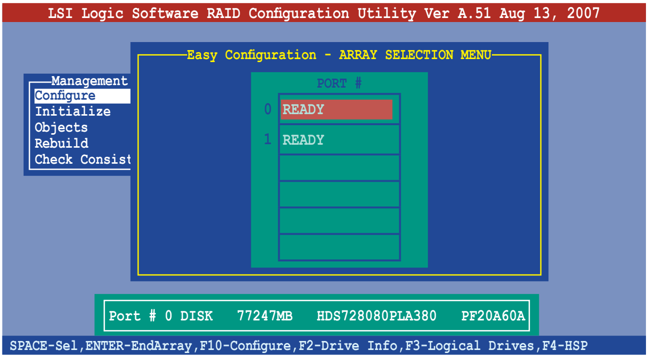
Using Easy Configuration

To create a RAID set using the **Easy Configuration** option:

1. From the utility main menu, highlight **Configure**, then press <Enter>.
2. Use the arrow keys to select **Easy Configuration**, then press <Enter>.

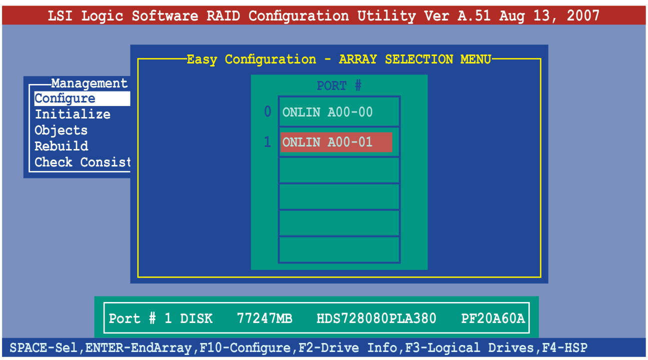


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drives you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

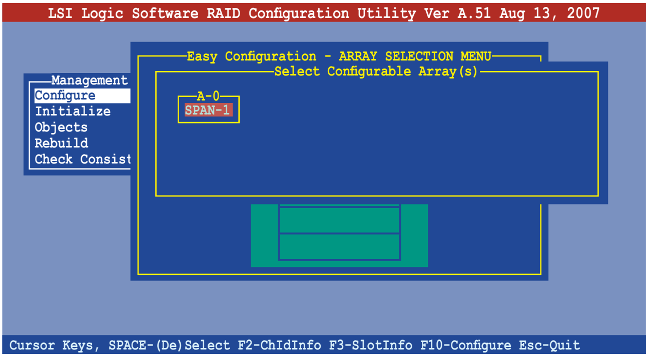


The information of the selected hard disk drive displays at the bottom of the screen.

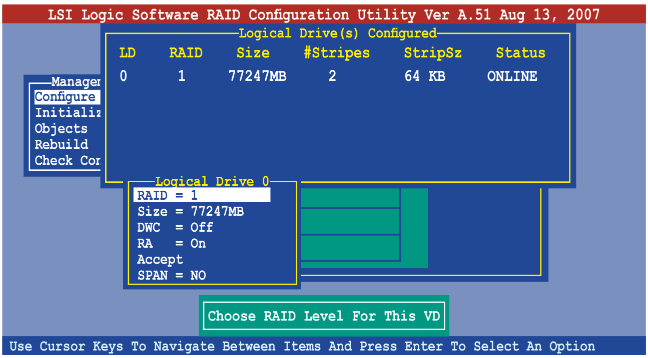
4. Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.



5. Press <F10>, select the configurable array, then press <SpaceBar>.

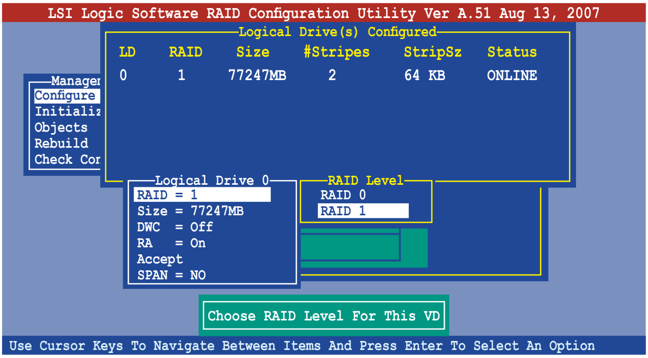


Press <F10> again, the logical drive information appears including a **Logical Drive** menu that allows you to change the logical drive parameters.



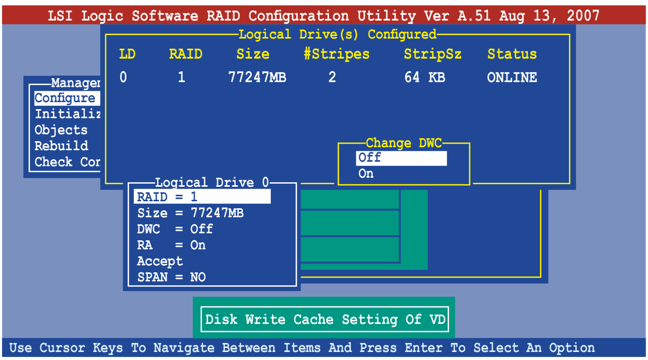
6. Select **RAID** from the **Logical Drive** menu, then press <Enter>.
7. Select the **RAID** level from the menu, then press <Enter>.

You need at least two identical hard disk drives when creating a RAID 1 set.



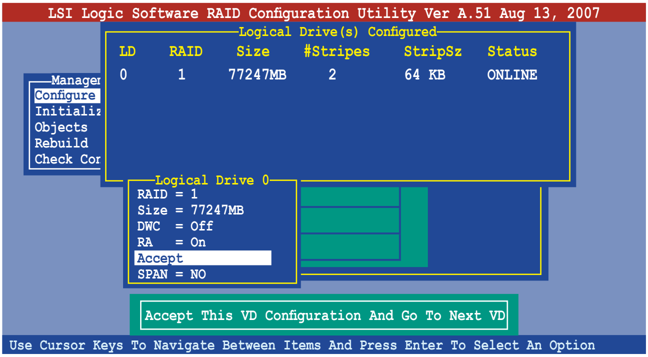
8. When creating a **RAID 1** set, select **DWC** from the **Logical Drive** menu, then press <Enter>.

   When creating a **RAID 0** set, proceed to step 10.
9. Select **On** to enable the **Disk Write Cache** setting, then press <Enter>.

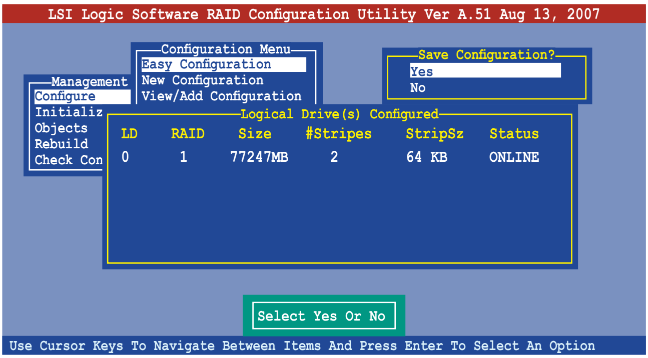


Enabling DWC can improve the performance, but with the risk of data loss.

10. When finished setting the selected logical drive configuration, select **Accept** from the menu, then press <Enter>.



11. Follow steps 5 to 10 to configure additional logical drives.
12. When prompted, save the configuration, then press <Esc> to return to the **Management Menu**.

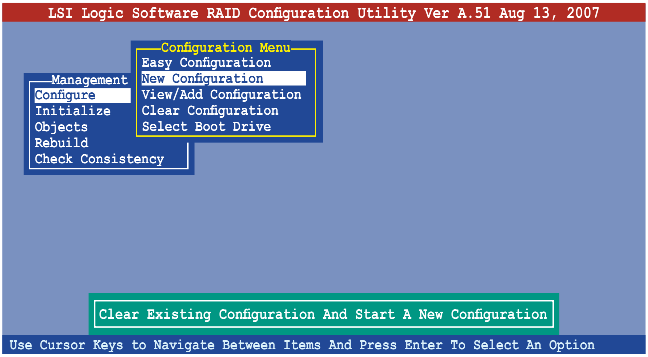


Using New Configuration

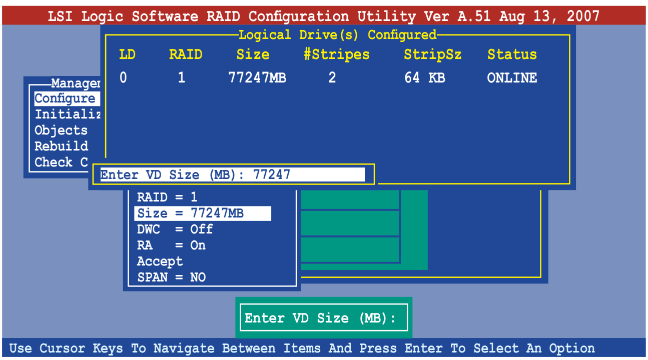
When a RAID set is already existing, using the **New Configuration** command erases the existing RAID configuration data. If you do not want to delete the existing RAID set, use the **View/Add Configuration** command to view or create another RAID configuration.

To create a RAID set using the **New Configuration** option:

1. From the utility main menu, highlight **Configure**, then press <Enter>.
2. Use the arrow keys to select **New Configuration**, then press <Enter>.



3. Follow steps 3 to 7 of the previous section.
4. Select **Size** from the **Logical Drive** menu, then press <Enter>.
5. Key-in the desired logical drive size, then press <Enter>.



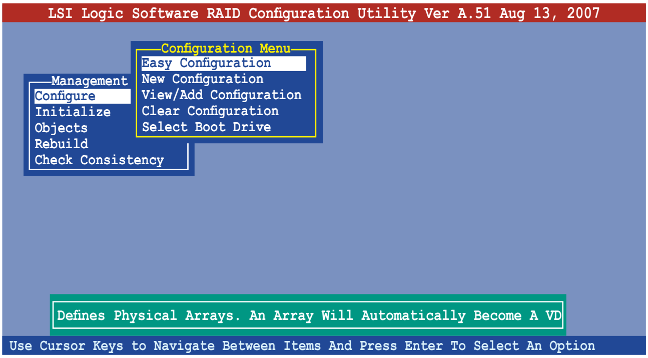
6. Follow steps 8 to 12 of the previous section to create the RAID set.

6.2.2 Creating a RAID 10 set

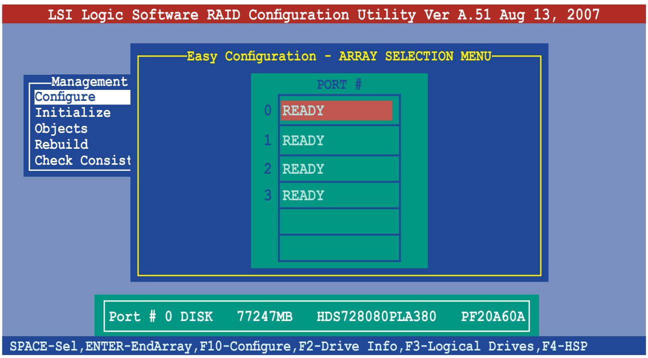
You can create a RAID 10 set using four identical hard disk drives.

To create a RAID 10 set using the Easy Configuration option:

1. From the utility main menu, highlight **Configure**, then press <Enter>.
2. Use the arrow keys to select **Easy Configuration**, then press <Enter>.

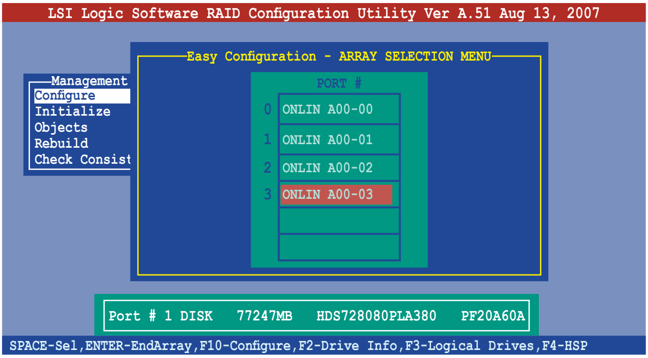


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

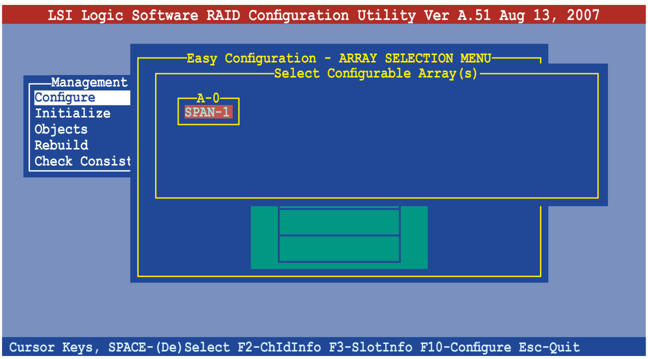


The information of the selected hard disk drive displays at the bottom of the screen.

4. Select all the drives required for the RAID 10 set, then press <Enter>. The configurable array appears on screen.



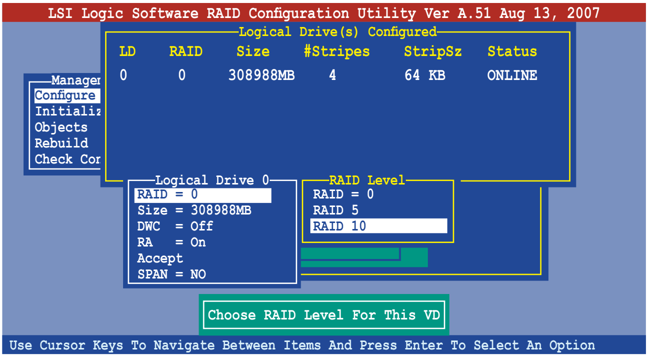
5. Press <F10>, select the configurable array, then press <SpaceBar>.



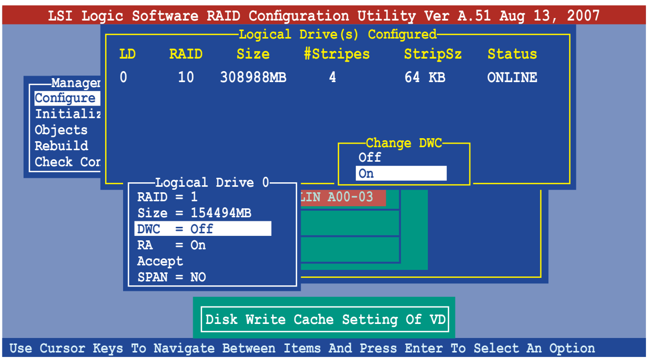
Press <F10> again, the logical drive information appears including a **Logical Drive** menu that allows you to change the logical drive parameters.

6. Select **RAID** from the **Logical Drive** menu, then press <Enter>.
7. Select **RAID 10** from the menu, then press <Enter>.

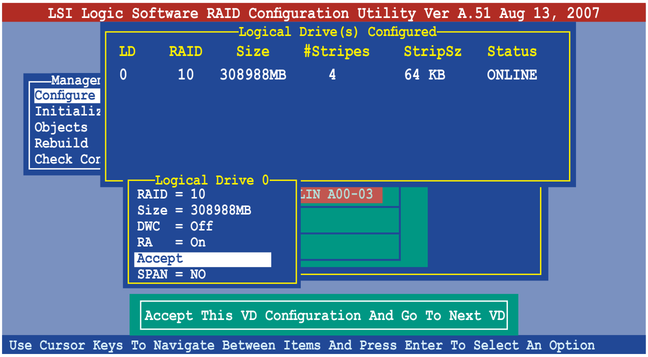
> You need at least four identical hard disk drives when creating a RAID 10 set.



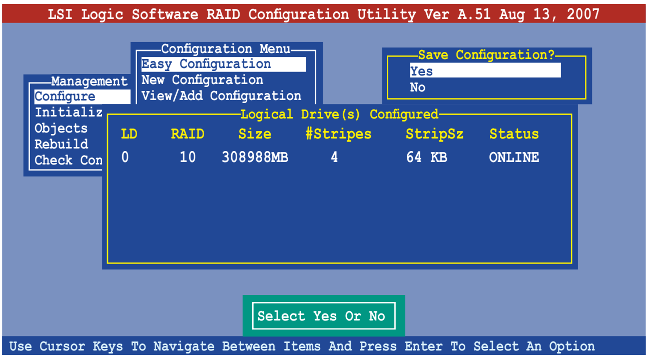
8. Select **DWC** from the **Logical Drive** menu, then press <Enter>.
9. Select **On** to enable the **Disk Write Cache** setting, then press <Enter>.



10. When finished setting the selected logical drive configuration, select **Accept** from the menu, then press <Enter>.



11. When prompted, save the configuration, then press <Esc> to return to the **Management Menu**.



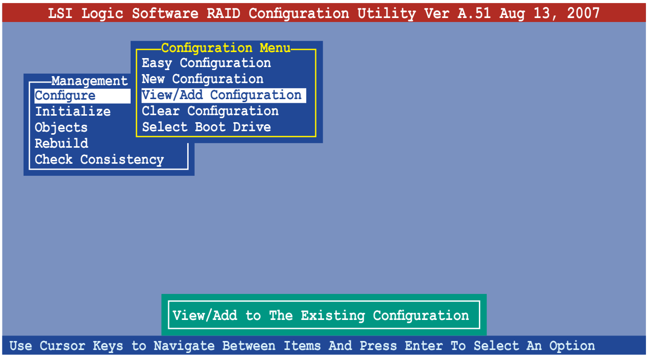
6.2.3 Adding or viewing a RAID configuration

You can add a new RAID configuration or view an existing configuration using the **View/Add Configuration** command.

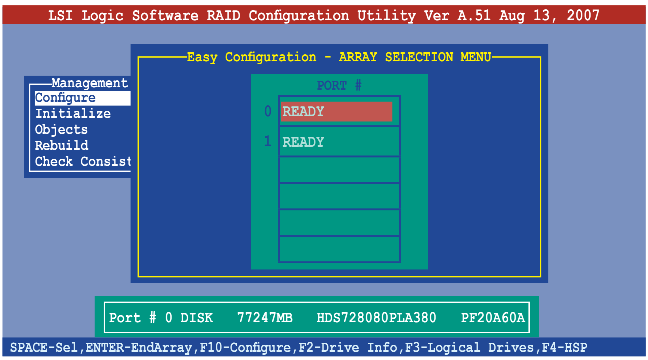
Adding a new RAID configuration

To add a new RAID configuration:

1. From the **Management Menu**, highlight **Configure**, then press <Enter>.
2. Use the arrow keys to select **View/Add Configuration**, then press <Enter>.

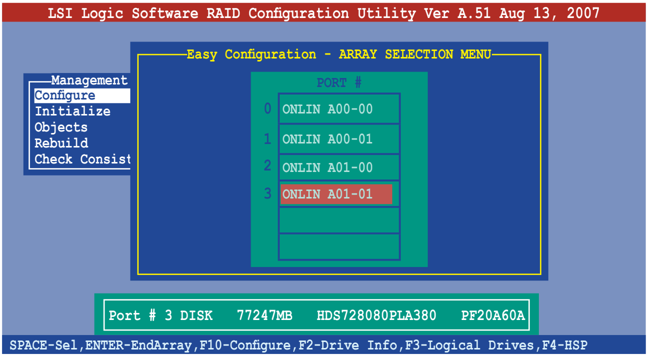


3. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <SpaceBar>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

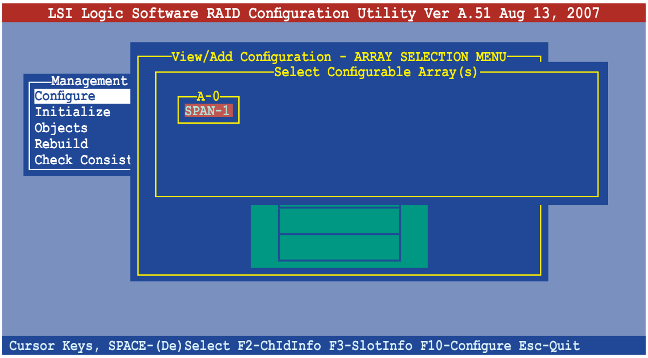


The information of the selected hard disk drive displays at the bottom of the screen.

4. Select all the drives required for the RAID set, then press <Enter>. The configurable array appears on screen.

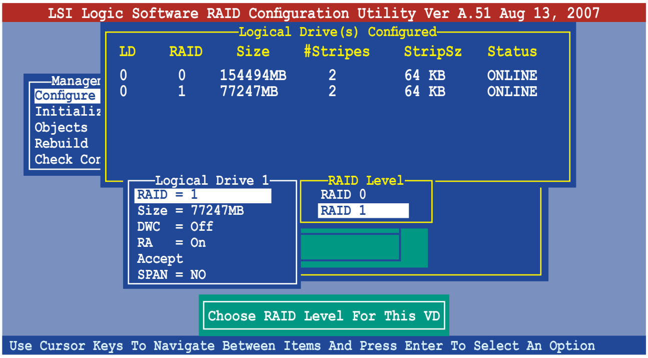


5. Press <F10>, select the configurable array, then press <SpaceBar>.



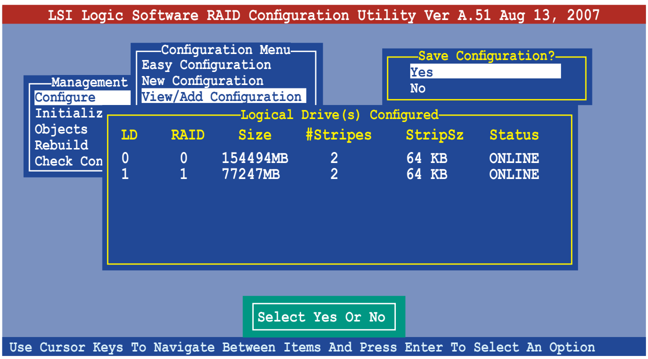
6. Press <F10> again, and select **RAID** from the **Logical Drive** menu, then press <Enter>.

7. Select the RAID level from the menu, then press <Enter>.



8. Follow steps 8 to 12 of the **Creating a RAID set: Using Easy Configuration** section.

9. When prompted, save the configuration, then press <Esc> to return to the **Management Menu**.



10. Follow steps 8 to 13 of the **Creating a RAID set: Using Easy Configuration** section to add the new RAID configuration.

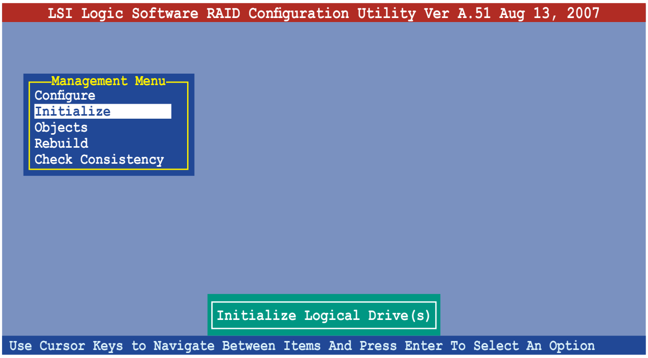
6.2.4 Initializing the logical drives

After creating the RAID set(s), you must initialize the logical drives. You may initialize the logical drives of a RAID set(s) using the **Initialize** or **Objects** command on the **Management Menu**.

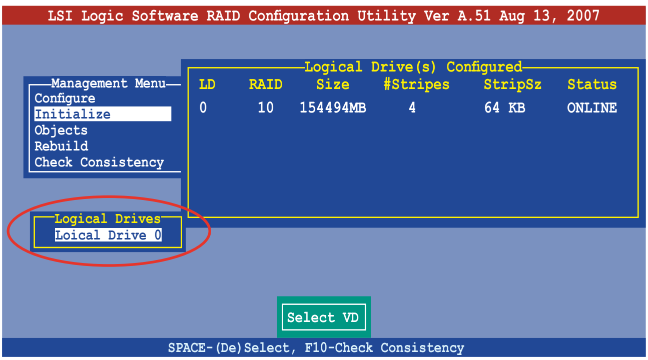
Using the Initialize command

To initialize the logical drive using the Initialize command:

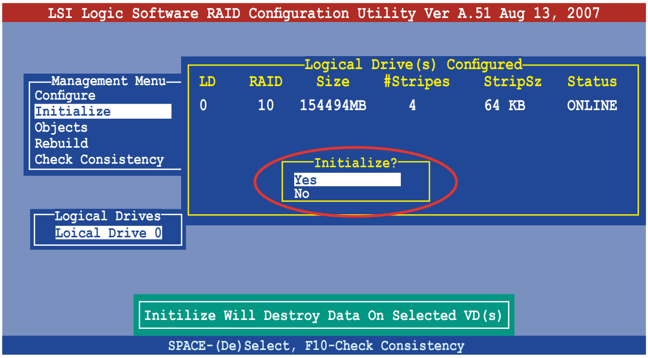
1. From the **Management Menu**, highlight **Initialize**, then press <Enter>.



2. The screen displays the available RAID set(s) and prompts you to select the logical drive to initialize. Use the arrow keys to select the logical drive from the **Logical Drive** selection, then press <Enter>.

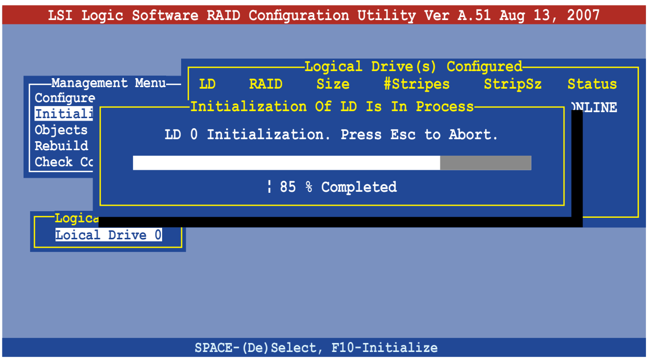


3. When prompted, press the <SpaceBar> to select **Yes** from the **Initialize?** dialog box, then press <Enter>. You may also press <F10> to initialize the drive without confirmation.

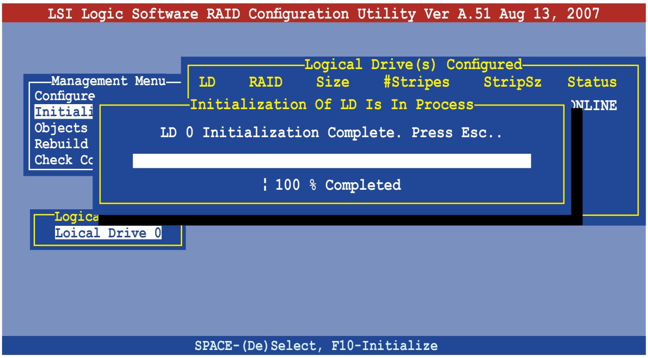


Initializing a logical drive(s) erases all data on the drive.

4. A progress bar appears on screen. If desired, press <Esc> to abort initialization.



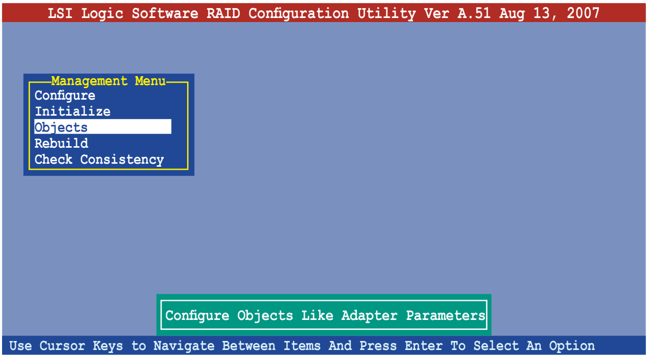
5. When initialization is completed, press <Esc>.



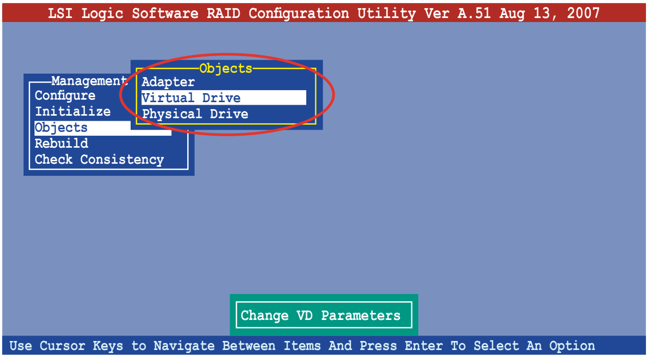
Using the Objects command

To initialize the logical drives using the **Objects** command:

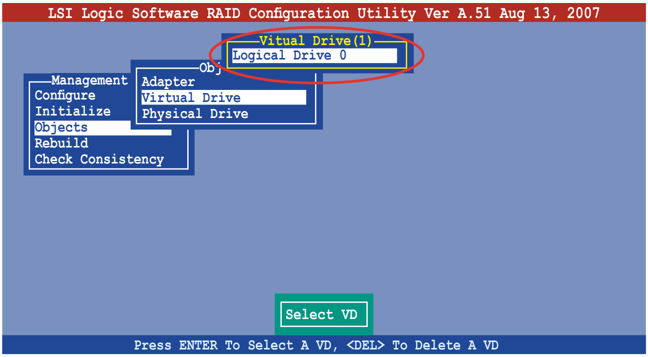
1. From the **Management Menu**, highlight **Objects**, then press <Enter>.



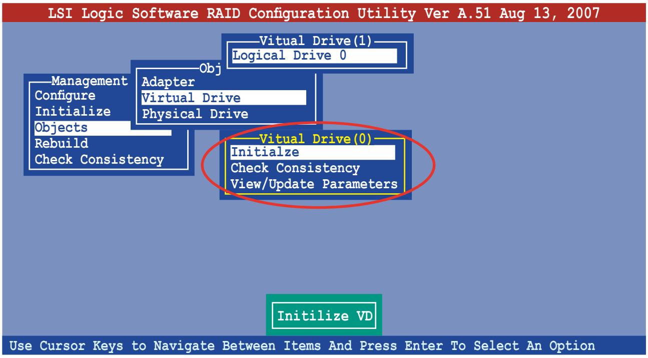
2. Select **Virtual Drive** from the **Objects** sub-menu, then press <Enter>.



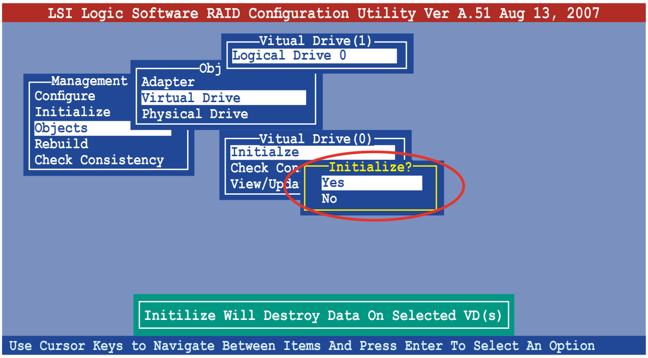
3. Select the logical drive to initialize from the **Virtual Drives** sub-menu, then press <Enter>.



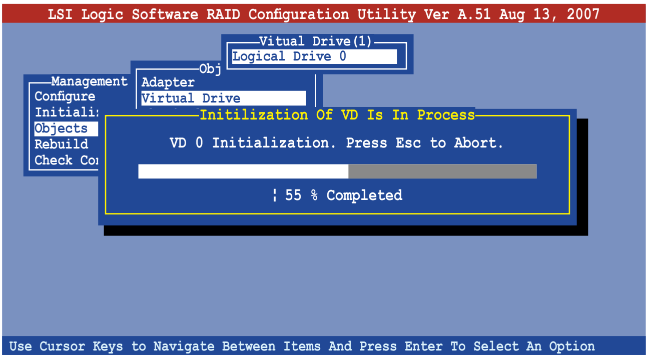
4. Select **Initialize** from the pop-up menu, then press <Enter> to start initialization.



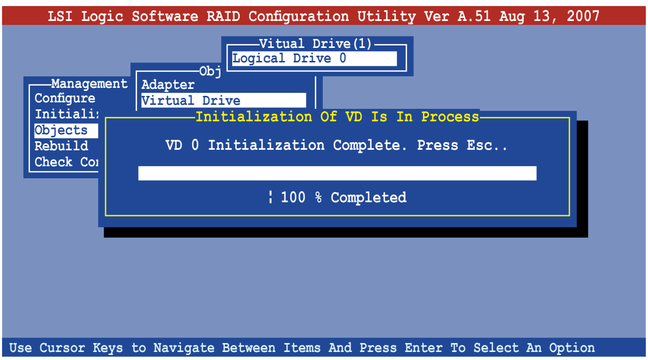
5. When prompted, press the <SpaceBar> to select **Yes** from the **Initialize?** dialog box, then press <Enter>.



6. A progress bar appears on screen. If desired, press <Esc> to abort initialization.



7. When initialization is completed, press <Esc>.

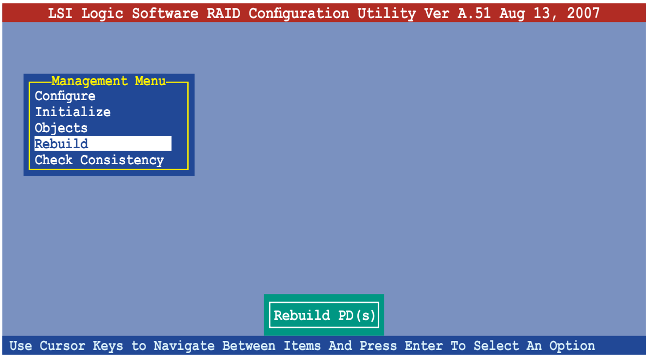


6.2.5 Rebuilding failed drives

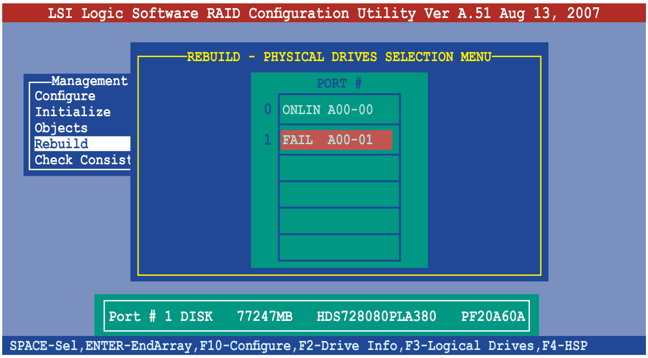
You can manually rebuild failed hard disk drives using the **Rebuild** command in the Management Menu.

To rebuild a failed hard disk drive:

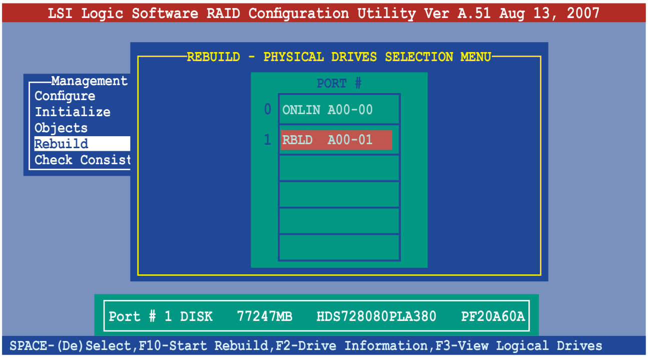
1. From the **Management Menu**, highlight **Rebuild**, then press <Enter>.



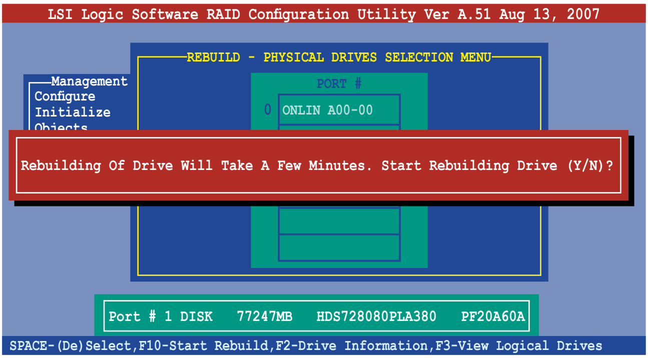
2. The **PHYSICAL DRIVES SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive you want to rebuild, then press <SpaceBar>.



3. After selecting the drive to rebuild, press <F10>. The indicator for the selected drive now shows **RBLD**.



4. When prompted, press <Y> to to rebuild the drive.



5. When rebuild is complete, press any key to continue.

6.2.6 Checking the drives for data consistency

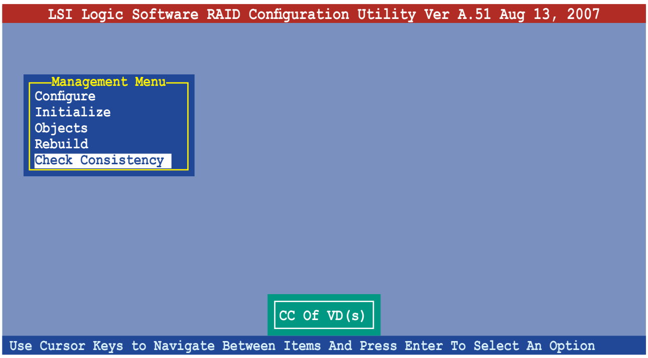
You can check and verify the accuracy of data redundancy in the selected logical drive. The utility can automatically detect and/or detect and correct any differences in data redundancy depending on the selected option in the **Objects** > **Adapter** menu.

The **Check Consistency** command is available only for logical drives included in a RAID 1 set.

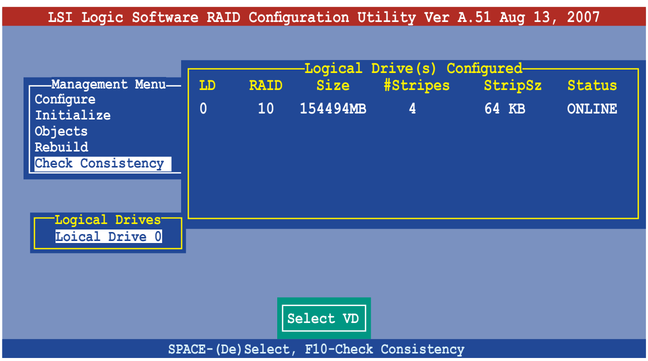
Using the Check Consistency

To check data consistency using the **Check Consistency** command:

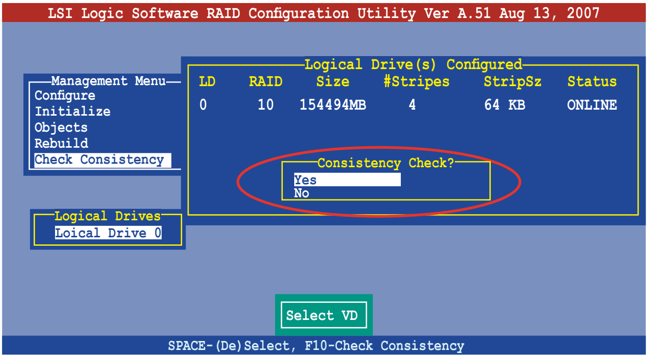
1. From the **Management Menu**, select **Check Consistency**, then press <Enter>.



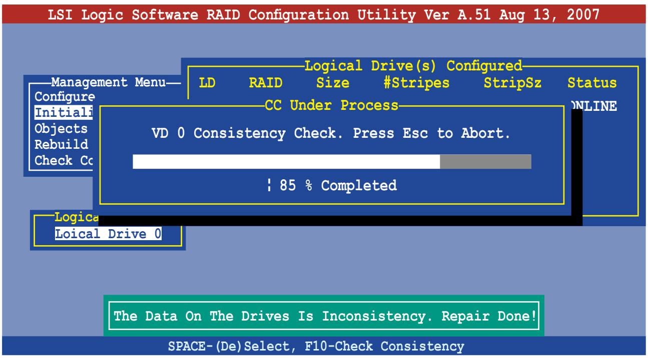
2. The screen displays the available RAID set(s) and prompts you to select the logical drive to check. Press the <Spacebar> to select the logical drive from the **Logical Drive** selection, then press <F10>.



3. When prompted, use the arrow keys to select **Yes** from the **Consistency Check** dialog box, then press <Enter>. You may also press <F10> to check the drive consistency.



A progress bar appears on screen.



4. While checking the disk consistency, press <Esc> to display the following options.

- **Stop** - Stops the consistency check. The utility stores the percentage of disk checked, When you restart checking, it continues from the last percentage completed rather than from zero percent.
- **Continue** - Continues the consistency check.
- **Abort** - Aborts the consistency check. When you restart checking, it continues from zero percent.

5. When checking is complete, press any key to continue.

Using the Objects command

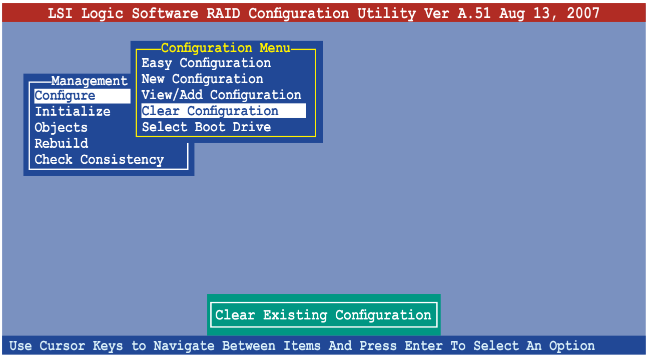
To check data consistency using the **Objects** command:

1. From the **Management Menu**, select **Objects**, then select **Logical Drive** from the menu.
2. Use the arrow keys to select the logical drive you want to check, then press <Enter>.
3. Select **Check Consistency** from the pop-up menu, then press <Enter>.
4. When prompted, use the arrow keys to select **Yes** from the dialog box to check the drive.
5. When checking is complete, press any key to continue.

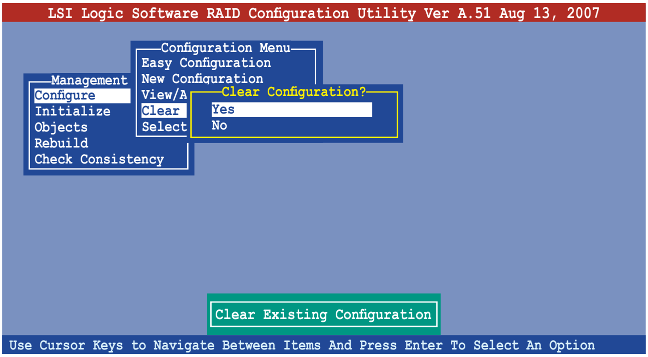
6.2.7 Deleting a RAID configuration

To delete a RAID configuration:

1. From the **Management Menu**, select **Configure** > **Clear Configuration**, then press <Enter>.



2. When prompted, use the arrow keys to select **Yes** from the **Clear Configuration?** dialog box, then press <Enter>.



The utility clears the current array.

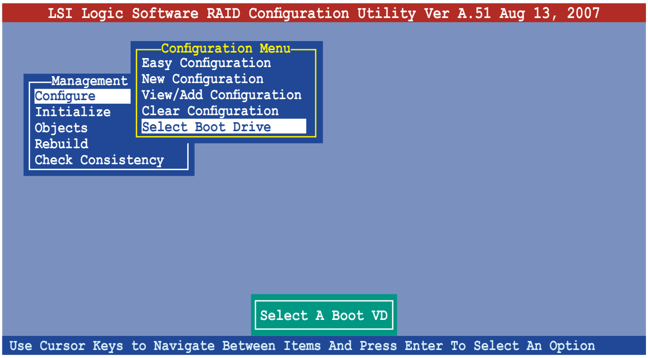
3. Press any key to continue.

6.2.8 Selecting the boot drive from a RAID set

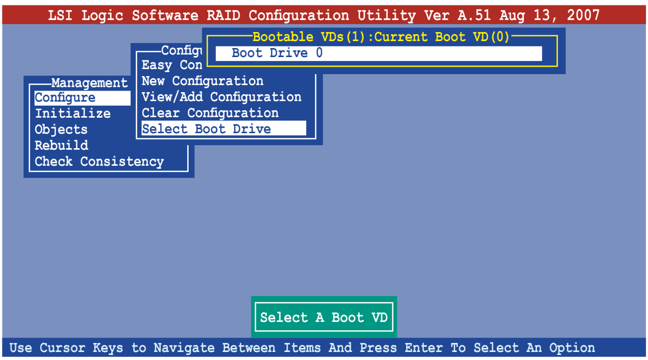
You must have created a new RAID configuration before you can select the boot drive from a RAID set. Refer to the **Creating a RAID set: Using New Configuration** section for details.

To select the boot drive from a RAID set:

1. From the **Management Menu**, select **Configure** > **Select Boot Drive**, then press <Enter>.



2. When prompted, use the arrow keys to select the bootable logical drive from the list, then press <Enter>.



3. The logical drive is selected as boot drive. Press any key to continue.

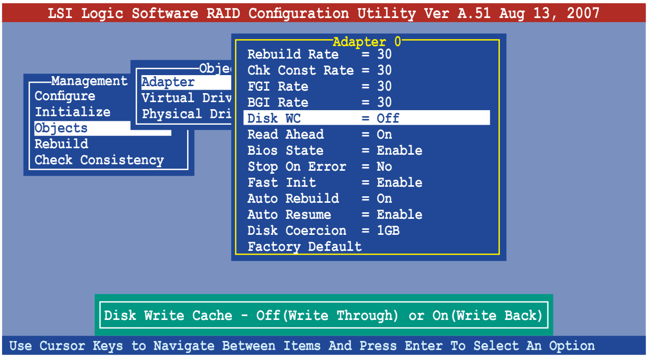
6.2.9 Enabling the WriteCache

You may enable the RAID controller's WriteCache option to improve the data transmission performance.

When you enable **WriteCache**, you may lose data when a power interruption occurs while transmitting or exchanging data among the drives.

To enable WriteCache:

1. From the **Management Menu**, select **Objects** > **Adapter**, then press <Enter> to display the adapter properties.
2. Select **WriteCache**, then press <Enter> to turn the option **On** (enabled).



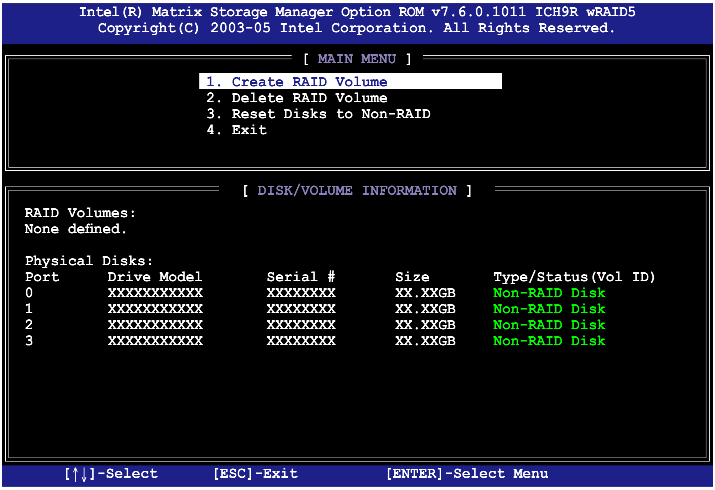
3. When finished, press any key to continue.

6.3 Intel® Matrix Storage Manager Option ROM Utility

The Intel® Matrix Storage Manager Option ROM utility allows you to create RAID 0, RAID 1, RAID 10, and RAID 5 set(s) from Serial ATA hard disk drives.

To enter the Intel® Matrix Storage Manager Option ROM Utility:

1. Turn on the system after installing all Serial ATA hard disk drives.
2. During POST, press <Ctrl+I> to display the utility main menu.



The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.

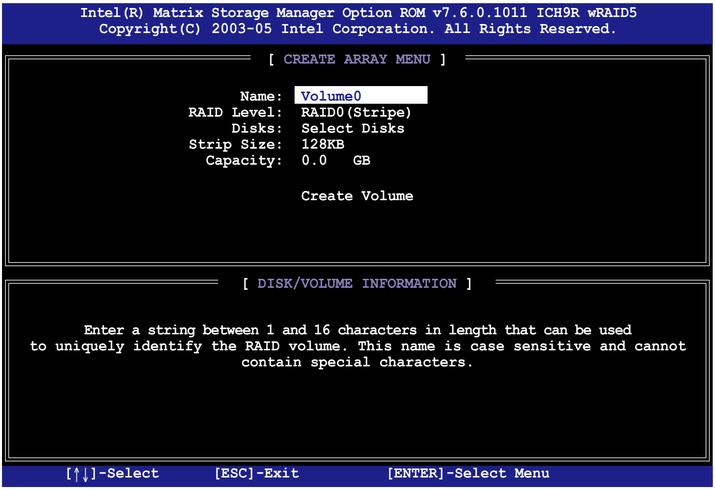
The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.

The utility supports maxium four hard disk drives for RAID configurration.

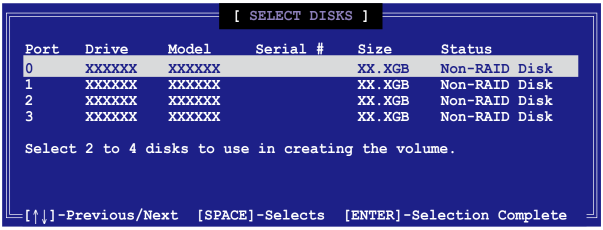
6.3.1 Creating a RAID 0 set (Stripe)

To create a RAID 0 set:

1. From the utility main menu, select **1. Create RAID Volume**, then press <Enter>. This screen appears.



2. Enter a name for the RAID 0 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select **RAID 0 (Stripe)**, then press <Enter>.
4. Highlight the **Disks** item, then press <Enter> to select the hard disk drives you want to include in the RAID set. The **SELECT DISKS** screen appears.



5. Use the up/down arrow key to highlight a drive, then press <Spacebar> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.

6. Use the up/down arrow key to select the stripe size for the RAID 0 array, then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The default stripe size is 128 KB.

A lower stripe size is recommended for server systems. A higher stripe size is recommended for multimedia computer systems used mainly for audio and video editing.

7. Highlight the **Capacity** item, enter the desired RAID volume capacity, then press <Enter>. The default value indicates the maximum allowed capacity.
8. When the **Create Volume** item is highlighted, press <Enter>. A warning message appears.

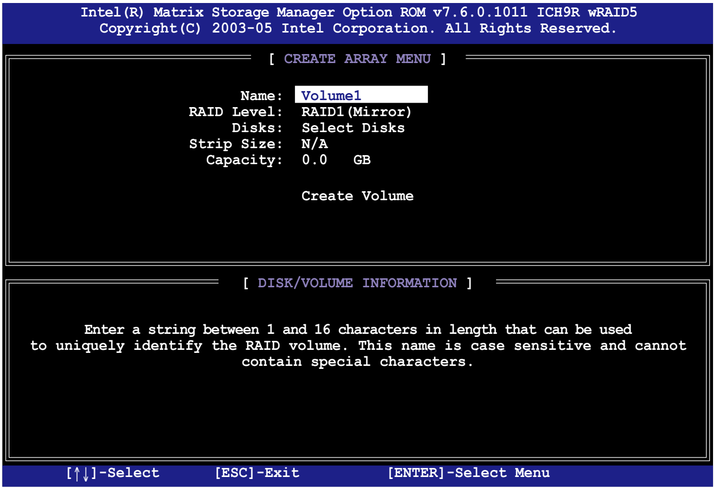
```
WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.
Are you sure you want to create this volume? (Y/N):
```

9. Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the **Create Array** menu.

6.3.2 Creating a RAID 1 set (Mirror)

To create a RAID 1 set:

1. From the utility main menu, select **1. Create RAID Volume**, then press <Enter>. This screen appears.



2. Enter a name for the RAID 1 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select **RAID 1 (Mirror)**, then press <Enter>.
4. Follow steps 4 to 5 and 7 to 9 of the previous section to create the RAID 1 set.

6.3.3 Creating a RAID 10 set (Stripe + Mirror)

To create a RAID 10 set:

1. From the utility main menu, select **1. Create RAID Volume**, then press <Enter>. This screen appears.

```
Intel(R) Matrix Storage Manager Option ROM v7.6.0.1011 ICH9R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

[ CREATE ARRAY MENU ]

        Name:  Volume1
  RAID Level:  RAID10(RAID0+1)
       Disks:  Select Disks
  Strip Size:  128KB
    Capacity:  0.0   GB

               Create Volume

[ DISK/VOLUME INFORMATION ]

Enter a string between 1 and 16 characters in length that can be used
to uniquely identify the RAID volume. This name is case sensitive and cannot
contain special characters.

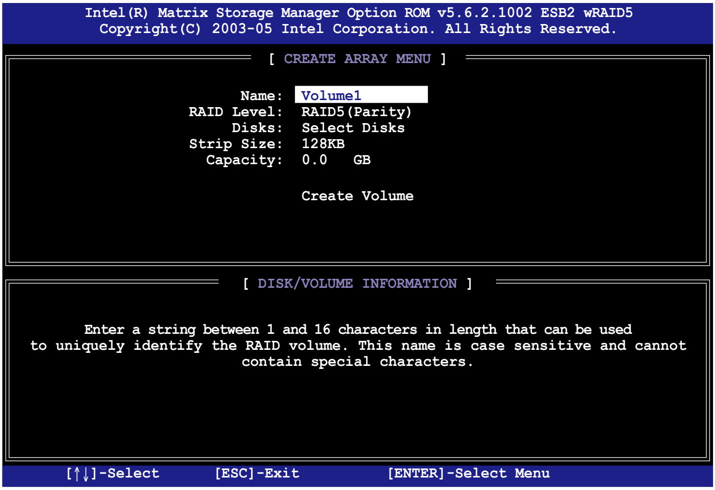
[↑↓]-Select     [ESC]-Exit     [ENTER]-Select Menu
```

2. Enter a name for the RAID 10 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select **RAID 10 (RAID0+1)**, then press <Enter>.
4. Follow steps 4 to 9 of section **6.3.1 Creating a RAID 0 set (striped)** to create the RAID 10 set.

6.3.4 Creating a RAID 5 set (Parity)

To create a RAID 5 set:

1. From the utility main menu, select **1. Create RAID Volume**, then press <Enter>. This screen appears.



2. Enter a name for the RAID 10 set, then press <Enter>.
3. Highlight **RAID Level**, press the up/down arrow key to select **RAID5**, then press <Enter>.
4. Follow steps 4 to 9 of section **6.3.1 Creating a RAID 0 set (striped)** to create the RAID 5 set.

6.3.5 Deleting a RAID set



Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the utility main menu, select **2. Delete RAID Volume**, then press <Enter> to display this screen.

```
     Intel(R) Matrix Storage Manager Option ROM v7.6.0.1011 ICH9R wRAID5
        Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

                          [ DELETE VOLUME MENU ]
 Name          Level              Drives      Capacity    Status      Bootable
 Volume0       RAIDX(xxxxx)       X           XXX.XGB     Normal      Yes

                                 [ HELP ]

     Deleting a volume will destroy the volume data on the drive(s) and
        cause any member disks to become available as non-RAID disks.

     WARNING: EXISTING DATA WITHIN THIS VOLUME WILL BE LOST AND
                          NON-RECOVERABLE.

 [↑↓]-Select      [<ESC>]-Previous Menu       [<Del>]-Delete Volume
```

2. Use the up/down arrow key to select the RAID set you want to delete, then press <Del>. This window appears.

```
                  [ DELETE VOLUME VERIFICATION ]

                  ALL DATA IN THE VOLUME WILL BE LOST!
        Are you sure you want to delete volume "VolumeX"? (Y/N):
```

3. Press <Y> to delete the RAID set and return to the utility main menu; otherwise, press <N> to return to the **Delete Volume** menu.

6.3.6 Resetting disks to Non-RAID

Take caution before you reset a RAID volume hard disk drive to non-RAID. Resetting a RAID volume hard disk drive deletes all internal RAID structure on the drive.

To reset a RAID set hard disk drive:

1. From the utility main menu, select **3. Reset Disks to Non-RAID**, then press <Enter> to display this screen.

```
[ RESET RAID DATA ]

Resetting RAID data will remove internal RAID structures
from the selected RAID disks. By removing these structures,
the drive will revert back to a non-RAID disk.

WARNING: Resetting a disk causes all data on the disk to be lost.

Port   Drive Model        Serial #         Size      Status
0      XXXXXXXXXXXX       XXXXXXXX         XX.XGB    Member Disk
1      XXXXXXXXXXXX       XXXXXXXX         XX.XGB    Member Disk
              Select the disks that should be reset.

 [↑↓]-Previous/Next  [SPACE]-Selects  [ENTER]-Selection Complete
```

2. Use the up/down arrow key to highlight the RAID set drive you want to reset, then press <Spacebar> to select.
3. Press <Enter> to reset the RAID set drive. A confirmation message appears.
4. Press <Y> to reset the drive or press <N> to return to the utility main menu.
5. Follow steps 2 to 4 to select and reset other RAID set drives.

6.3.7 Exiting the Intel® Matrix Storage Manager

To exit the utility:

1. From the utility main menu, select **4. Exit**, then press <Enter>. This window appears.

```
[ CONFIRM EXIT ]

Are you sure you want to exit? (Y/N):
```

2. Press <Y> to exit or press <N> to return to the utility main menu.

Chapter 7

This chapter provides instructions for installing the necessary drivers for different system components.



Driver installation

7.1 RAID driver installation

After creating the RAID sets for your server system, you are now ready to install an operating system to the independent hard disk drive or bootable array. This part provides instructions on how to install the RAID controller drivers during OS installation.

7.1.1 Creating a RAID driver disk

You may have to use another system to create the RAID driver disk from the system/motherboard support CD or from the Internet.

If you have created RAID sets with the LSI Software RAID configuration utility, the boot priority of the SATA optical disk drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

A floppy disk with the RAID driver is required when installing Windows® or Red Hat ® Enterprise operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support CD).

To create a RAID driver disk in DOS environment:

1. Place the motherboard support CD in the optical drive.
2. Restart the computer, then enter the BIOS Setup.
3. Select the optical drive as the first boot priority to boot from the support CD. Save your changes, then exit the BIOS Setup.
4. Restart the computer.
5. Press any key when prompted to boot from CD.

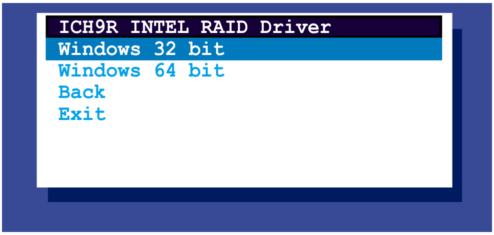
```
Loading FreeDOS FAT KERNEL GO!
Press any key to boot from CDROM...
```

The Makedisk menu appears.

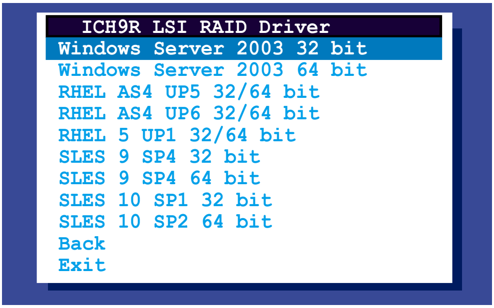
```
Create Driver Diskette Menu
ICH9R INTEL RAID Driver
ICH9R LSI RAID Driver
Broadcom ASF Firmware Update
FreeDOS command prompt
```

6. Use the arrow keys to select the type of RAID driver disk you want to ceate and press <Enter> to enter the sub-menu.

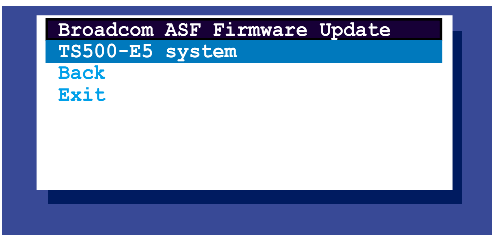
ICH9R INTEL RAID Driver



ICH9R LSI RAID Driver



Broadcom ASF Firmware Update



7. Locate the RAID driver and place a blank, high-density floppy disk to the floppy disk drive.
8. Press <Enter>.
9. Follow screen instructions to create the driver disk.

To create a RAID driver disk in Windows® Server environment:

1. Restart the system from the hard disk drive, then place the system/motherboard support CD in the optical drive.
2. Browse the contents of the support CD to locate the driver disk utility. The Windows 32-bit OS RAID driver disk for the Intel® Matrix Storage Manager is located in:

   \Drivers\ICH9R Intel RAID\Driver\makedisk\win32\f6flpy32.exe

   The Windows 64-bit OS RAID driver disk for the Intel® Matrix Storage Manager is located in:

   \Drivers\ICH9R Intel RAID\Driver\makedisk\win64\f6flpy64.exe

3. Insert a formatted high-density floppy disk to the floppy disk drive.
4. Follow screen instructions to complete the process.
5. After creating a RAID driver disk, eject the floppy disk, then write-protect it to prevent computer virus infection.

To create a RAID driver disk in Red Hat® Enterprise Linux server environment:

1. Insert a blank formatted high-density floppy disk to the floppy disk drive.
2. Decompress the file into the floppy disk from the following path in the support CD:

   For LSI Logic Embedded SATA RAID Driver:

   \Drivers\Intel LSI RAID\Driver\makedisk

3. Eject the floppy disk.

7.1.2 Installing the RAID controller driver

Windows® Server OS

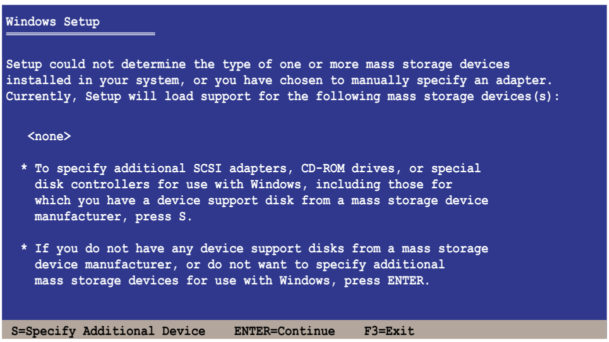
During Windows® Server OS installation

To install the RAID controller driver when installing Windows® Server OS:

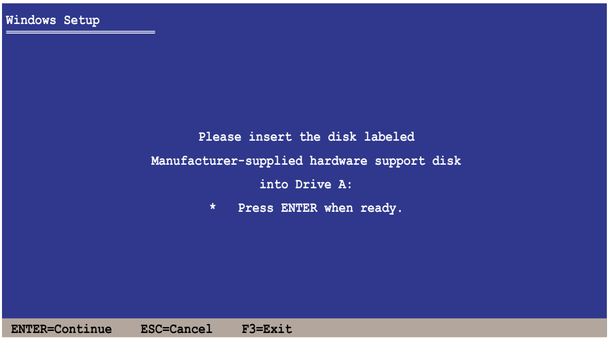
1. Boot the computer using the Windows® Server installation CD. The Windows® Server OS Setup starts.



2. Press <F6> when the message “Press F6 if you need to install a third party SCSI or RAID driver...” appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



4. Insert the RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.

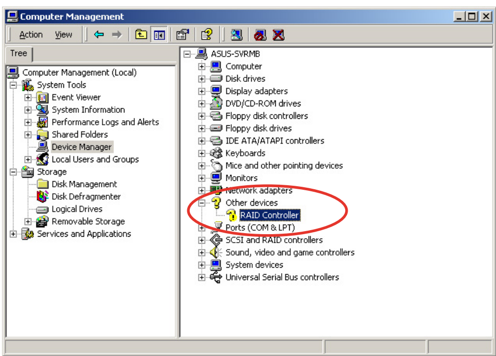


5. Select the RAID controller driver you need from the list, then press <Enter>.
6. The Windows® Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

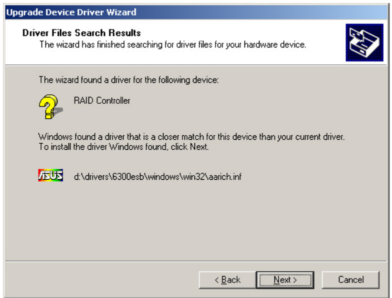
To an existing Windows® Server OS

To install the RAID controller driver on an existing Windows® Server OS:

1. Restart the computer, then log in with **Administrator** privileges.
2. Windows® automatically detects the RAID controller and displays a **New Hardware Found** window. Click **Cancel**.
3. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
4. Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.

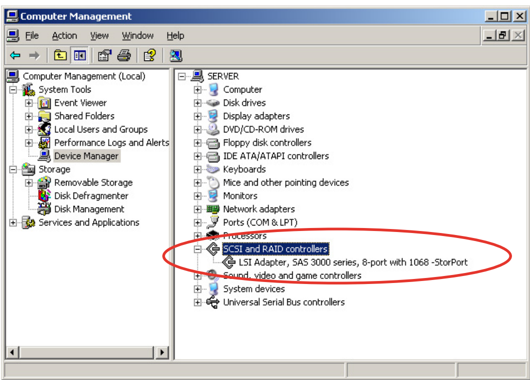


5. Right-click the **RAID controller** item, then select **Properties**.
6. Click the **Driver** tab, then click the **Update Driver** button.
7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.
8. Insert the RAID driver disk you created earlier to the floppy disk drive.
9. Select the option **Search for a suitable driver for my device (recommended)**, then click **Next**.
10. The wizard searches the RAID controller drivers. When found, click **Next** to install the drivers.
11. Click **Finish** after the driver installation is done.



To verify the RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the “+” sign before the item **SCSI and RAID controllers**, then the LSI Adapter, SAS 3000 series, 8-port with 1068-StorPort item should appear.



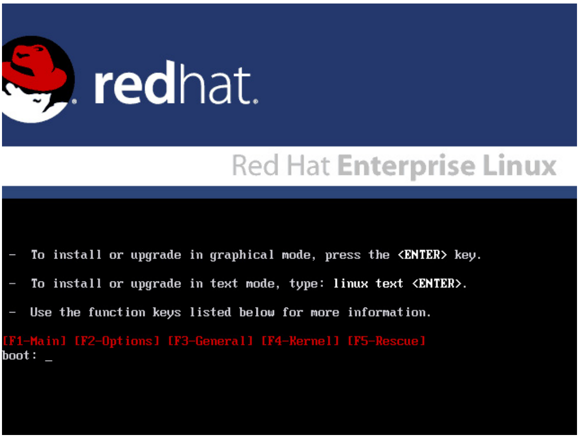
The screen differs based on the controller.

4. Right-click the **RAID controller** driver item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

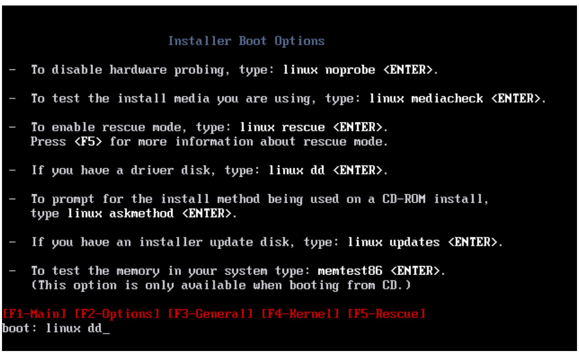
Red Hat® Enterprise

To install the Intel® ICH9R LSI Logic Embedded SATA RAID controller driver when installing Red Hat® Enterprise OS:

1. Boot the system from the Red Hat® Installation CD.

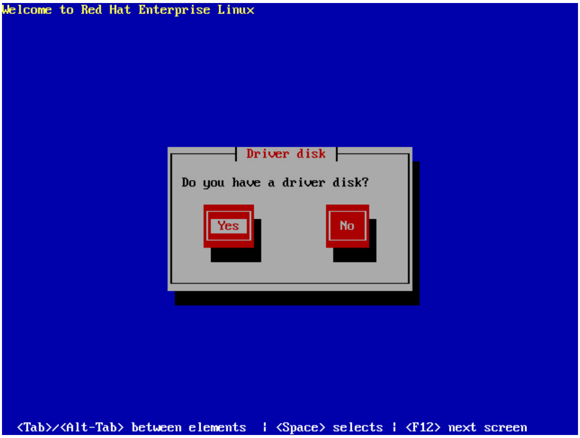


2. At the `boot:`, type `linux dd` , then press <Enter>.

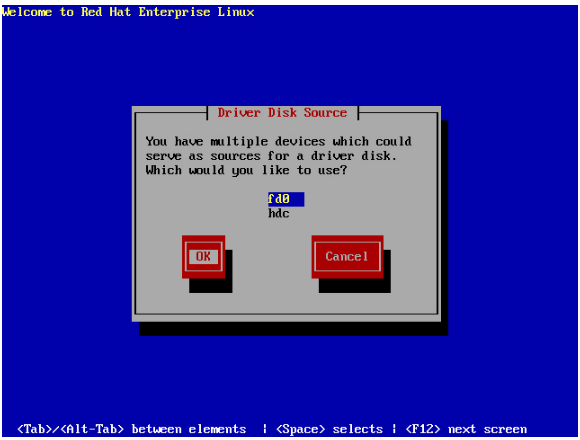


When installing a Red Hat 2.4 kernel with a Driver Update Disk (DUD) to a disk drive attached to a LSI HBA, use the command below at the install prompt: **`linux dd updates.`**

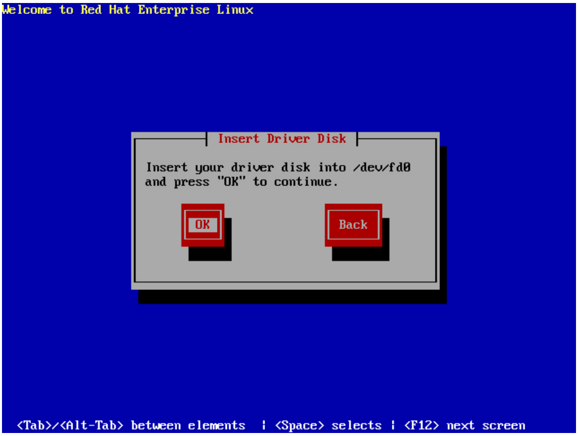
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>



4. Select **fd0** using the <Tab> key when asked to select the driver disk source. Press <Tab> to move the cursor to **OK**, then press <Enter>.



5. When prompted, insert the Red Hat® Enterprise RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



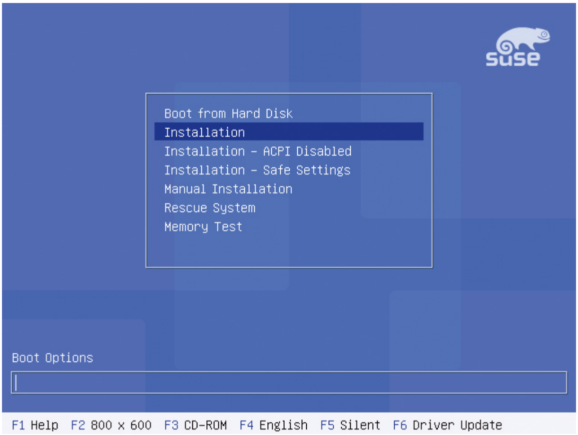
The drivers for the RAID controller are installed to the system.

6. Follow screen instructions to continue the OS installation.

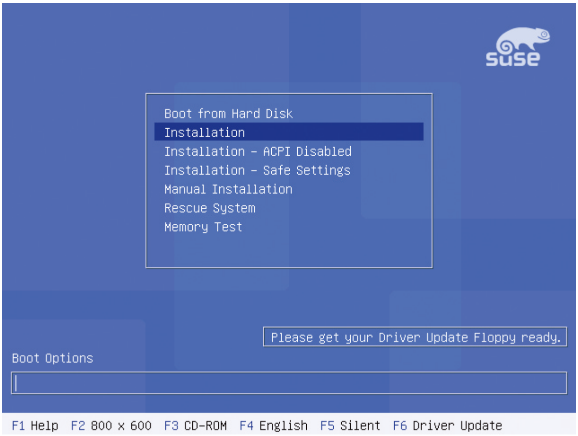
SuSE Linux

To install the RAID controller driver when installing SuSE Linux OS:

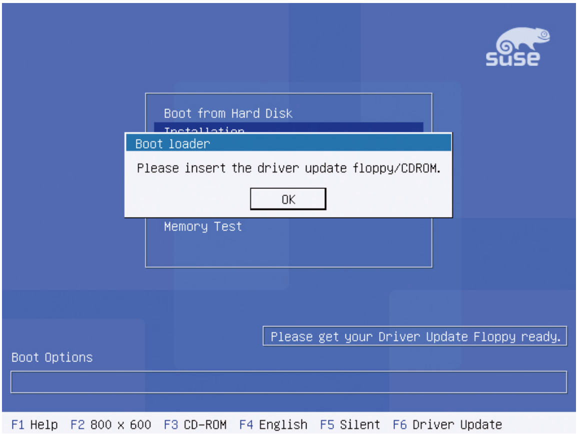
1. Boot the system from the SuSE Installation CD.
2. Select Installation from the **Boot Options** menu, then press <Enter>.



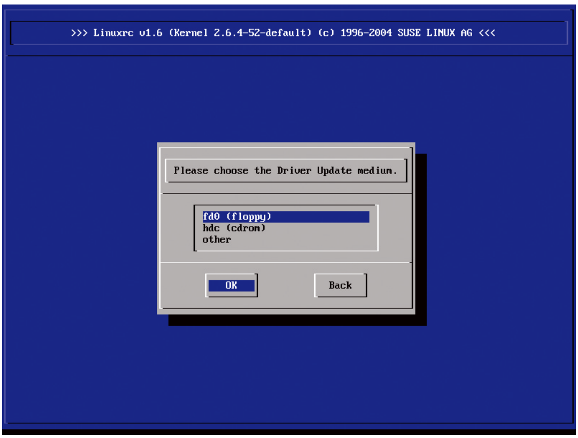
3. A message instructs you to prepare the RAID driver disk. Press <F6>.



4. When prompted, insert the RAID driver disk to the floppy disk drive, then press <Enter>.



5. When prompted, select the floppy disk drive (fd0) as the driver update medium, select **OK**, then press <Enter>.



The drivers for the RAID controller are installed to the system.

7.2 Intel® chipset device installation

This section provides instructions on how to install the Plug and Play components for the Intel® chipset on the system.

You need to manually install the Intel® chipset software on a Windows Server operating system. To install the Intel® chipset device software:

1. Restart the computer, then log on with **Administrator** privileges.
2. Insert the motherboard/system support CD to the optical drive. The support CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.
3. Click the item **Intel(R) Chipset Device Installation Utility** from the menu.



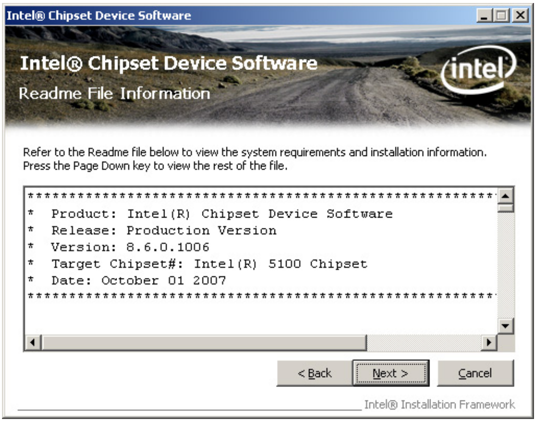
4. The **Intel(R) Chipset Device Software** window appears. Click **Next** to start installation.



5. Select **Yes** to accept the terms of the **License Agreement** and continue the process.



6. Read the **Readme File Information** and press **Next** to continue the installation.



7. After completing the installation, click **Finish** to complete the setup process.



7.3 LAN driver installation

This section provides instructions on how to install the Broadcom® Gigabit LAN controller drivers on a Windows® Server OS.

To install the LAN controller drivers:

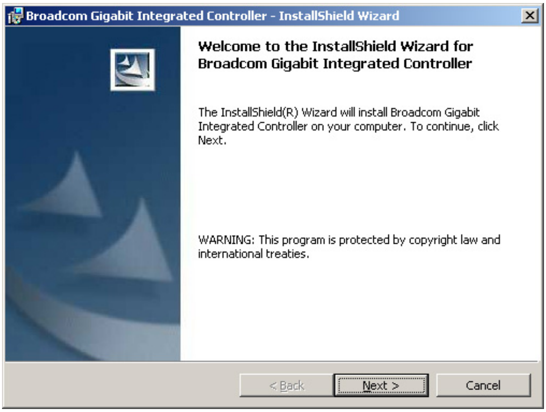
1. Restart the computer, then log on with Administrator privileges.
2. Insert the motherboard/system support CD to the optical drive. The CD automatically displays the Drivers menu if Autorun is enabled in your computer.

- Windows® automatically detects the LAN controllers and displays a New Hardware Found window. Click **Cancel** to close this window.
- If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the CD.

3. Click the **Broadcom 5721 Driver** to begin installation.



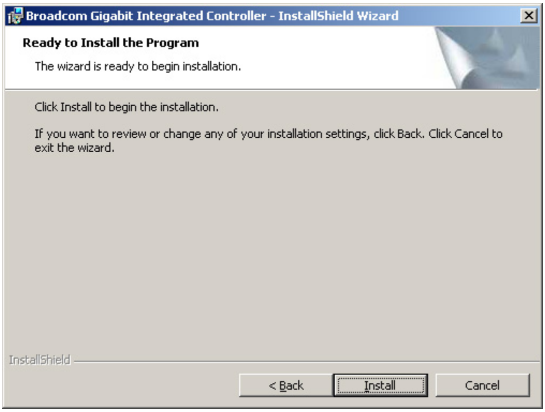
4. Click **Next** when the InstallShield Wizard window appears.



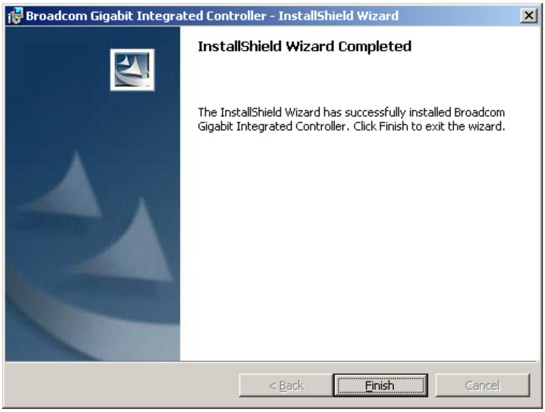
5. Toggle **I accept the terms in the license agreement** and click **Next** to continue.



6. Click **Install** to start the installation.



7. Click **Finish** to exit the wizard when the installation is completed.



7.4 VGA driver installation

This section provides instructions on how to install the XGI Volari Z9s Video Graphics Adapter (VGA) driver.

7.4.1 Windows® Server

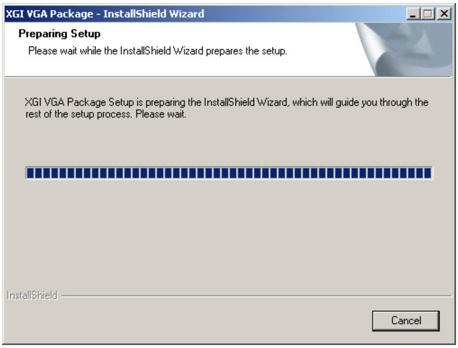
You need to manually install the XGI Volari Z9s VGA driver on a Windows® Server operating system. To install the XGI Volari Z9s VGA driver:

1. Restart the computer, then log on with Administrator privileges.
2. Insert the motherboard/system support CD to the optical drive. The support CD automatically displays the Drivers menu if Autorun is enabled in your computer.

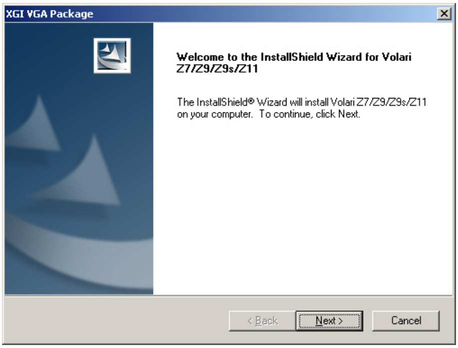
   The **Drivers** menu if Autorun is enabled in your computer.



3. The **XGI VGA Package** window appears, preparing the setup.

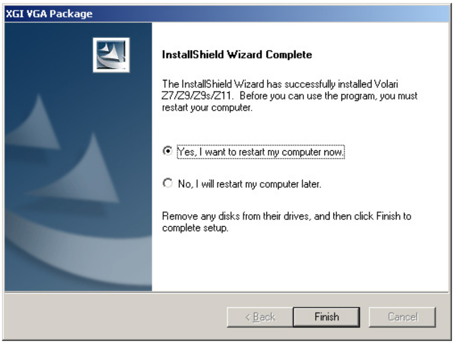


4. Click **Next** to start the installation.



5. The system will update the VGA driver.

6. When the installation completes, click **Finish** to restart your computer before using the program.



7.5 Management applications and utilities installation

The support CD that came with the motherboard package contains the drivers, management applications, and utilities that you can install to avail all motherboard features.

The contents of the support CD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for updates.

7.5.1 Running the support CD

Place the support CD to the optical drive. The CD automatically displays the Drivers menu if Autorun is enabled in your computer.

If Autorun is NOT enabled in your computer, browse the contents of the support CD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the CD.

7.5.2 Drivers menu

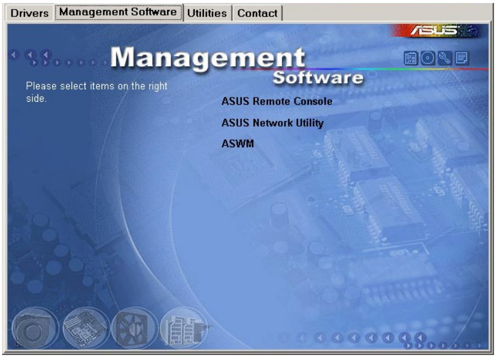
The Drivers menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.

The screen display and driver options vary under different operating system versions.



7.5.3 Management Software menu

The Management Software menu displays the available network and server monitoring applications. Click an item to install.



7.5.4 Utilities menu

The Utilities menu displays the software applications and utilities that the motherboard supports. Click an item to install.



7.5.5 Contact information

Click the Contact tab to display the ASUS contact information. You can also find this information on the inside front cover of this user guide.

